Scientific American.

A WEEKLY JOURNAL OF PRACTICAL INFORMATION IN ART, SCIENCE, MECHANICS, CHEMISTRY AND MANUFACTURES

VOL. VI.---NO. 13. NEW YORK, MARCH 29, 1862. NEW SERIES.

Improved Planing Machine.

The machine here illustrated is a modification of the Woodworth planer, the modification consisting in arrangements by which the bed may be raised or lowered while the machine is running, so as to plane wedge-shaped forms, and in improvements in the feed rolls, by which wet, green or icy boards may be fed into the machine and planed.

The bed, B, rests in the frame, A, on the wedges, C, which are connected to a screw on the end of the shaft, *f*, of the hand wheel, W, in such manner that by turning this wheel the wedges are forced in or drawn out to raise or lower the bed. By means of the scale, V, the hight of the bed may be adjusted to plane the stuff to any thickness required.

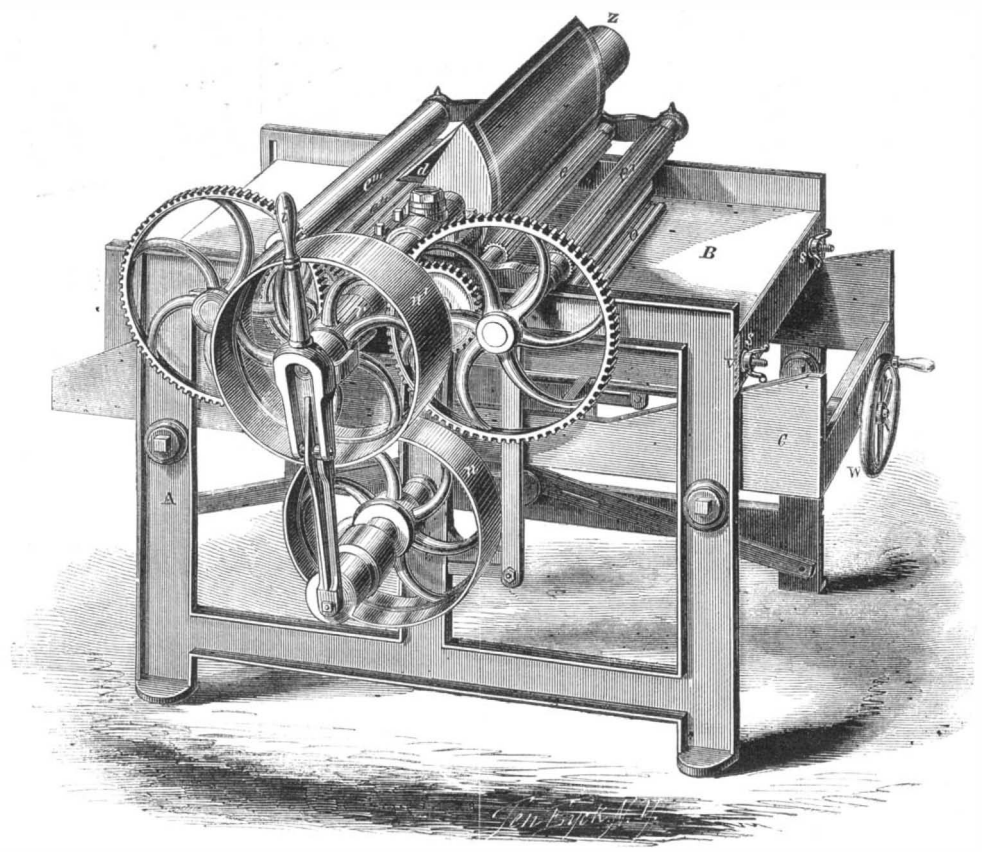
The stuff is fed under the revolving knives, *d*, by the two grooved rollers, *e* and *e'*, and the smooth rollers, *e''* and *e'''*, hold the board down as it leaves the knives, and thus prevent the end of the board bending or tilting up, and being cut thinner than the other portions.

In planing wet or green stuff the two friction rollers, one of which is shown at *o*, are raised by turning the two thumb screws, S S. These, in connection with the geared rollers, produce a powerful feed apparatus. The feed works may be stopped by means of the handle, I, while the rest of the machine is running.

Z is the main driving pulley, and it has upon the opposite end of its shaft the feed pulley, which is connected by belts with the pulley, *n*, and that with *n'*, which drives the cone pinion, R, by a clutch. This pinion drives the four rollers, *e e' e'' e'''*, which are held down by weights suspended on levers shown under the machine.

The inventor says that this machine will plane stuff from one-fourth of an inch to four inches in thickness, at the rate of 10,000 feet in ten hours; and that it is particularly adapted to planing wagon shafts and other wedge-shaped pieces, as well as boards tapering like clapboards.

Any further information in relation to this machine may be obtained by addressing the manufacturer, C. C. Whittelsey, at Malone, N. Y.



WHITTELSEY'S PLANING MACHINE.

Dangers of Benzine in Varnish Making.

In a late issue we noticed the explosion of benzine which had taken place at Wright's varnish factory, Philadelphia, by which the owner of the establishment lost his life. The Coroner has examined into the case, and his jury has rendered a verdict. Mr. Wright's father and brother were examned. For three months past experiments were made n introducing benzine as a substitute for turpentine in the manufacture of varnish. At first the test was made in the yard, in open air, in small quantities. This was successful. The process was then commenced on a small scale inside the building. This, too, was successful.

A larger quantity was then tried, in a larger kettle, in which the proportion of benzine was five barrels to the rest of the ingredients. A batch thus made had not perfectly amalgamated, and afterward it was put back into the kettle to boil still further. It was to this batch that the accident occurred. Benzine reaches the point of ebullition at a lower temperature than turpentine, and necessarily at a much lower heat than linseed oil, which in varnish making is combined with it. It volatilizes at a very gentle heat, and forms an explosive gas, in connection with the air, scarcely less dangerous than gunpowder. In the present instance the room was nearly air-tight, and the force of the explosion was equivalent to that of a gunpowder magazine.

The contact of the gas with the fire was made by the gas passing between the sides of the boiler and the brickwork. The verdict was accidental death.

THE iron-clad ship in course of construction at Philadelphia is being pushed forward with great rapidity. Over 400 hands are engaged in the yard, while at least 1,000 more are employed by the various machine shops throughout the city in planing the plates which are intended to cover the planking. These plates are four and a half inches thick, fifteen feet long, and thirty inches wide. In about two weeks the workmen will commence to put the lower tier of plates upon the hull, and the upper ones will not all go on until after she is launched.

SAVING TEN PER CENT OF FLOUR.

The last number of *Le Génie Industriel* has a review of a pamphlet by M. C. Decharme, Doctor of Sciences and Professor at the Lyceum of Amiens, which was written for the purpose of advocating the hulling of grain before it is ground, which he calls the system of Poissant.

Dr. Decharme says that by the usual mode of grinding grain the yield of flour is only 78 to 80 per cent of the weight of the grain, while by Poissant's method 90 to 95 per cent is obtained. He states the increased product, as ascertained by M. Bénard, verifying chemist of Amiens, is for wheat, 11 per cent, for rye 10 per cent, and for barley 13 per cent. Nor is this all. By the experiments of Mège-Mouriès it was ascertained that the most nutritive part of flour is that which is nearest the outside of the kernel and it grows gradually less nutritive toward the center. Consequently the ten per cent of flour that is lost by its adhering to the hull in the present mode of grinding is the portion which is most nutritive. M. Bénard found that the flour of unhulled wheat contained 28.80 per cent gluten, while that of the hul led whea contains 29.20 per cent, in the first flour 1.1375 of nitrogen, in the second 1.1725 of nitrogen. M. Bénard also says that the bread made from the hulled grain is quite as beautiful and as agreeable to the taste as that made from ordinary flour.

The hulled grain is also found to keep much better than grain in the hull. M. Hamon inclosed a quantity of the hulled wheat in a flagon, and at the end of several years it was found to have no bad odor, while unhulled grain exposed under the same circumstances became a brown and nauseous mass. The explanation suggested for this better preservation of the hulled grain, is, that weevils and animalcules which destroy grain deposit their eggs in the hull.

Some ten or twelve years ago we described an invention by Mr. Bentz, of Baltimore, for removing the hulls of wheat kernels by steaming them slightly and driving them through small apertures, but whether this plan is the same as M. Poissant's we do not know.

So great was the demand for the SCIENTIFIC AMERICAN which contained engravings of the *Monitor* and the *Merrimac* that we have been obliged to print an extra edition of nearly 5,000 copies, to meet the demand.

OUR next issue will contain a splendid engraving of Capt. Ericsson, the inventor and constructer of the *Monitor*.

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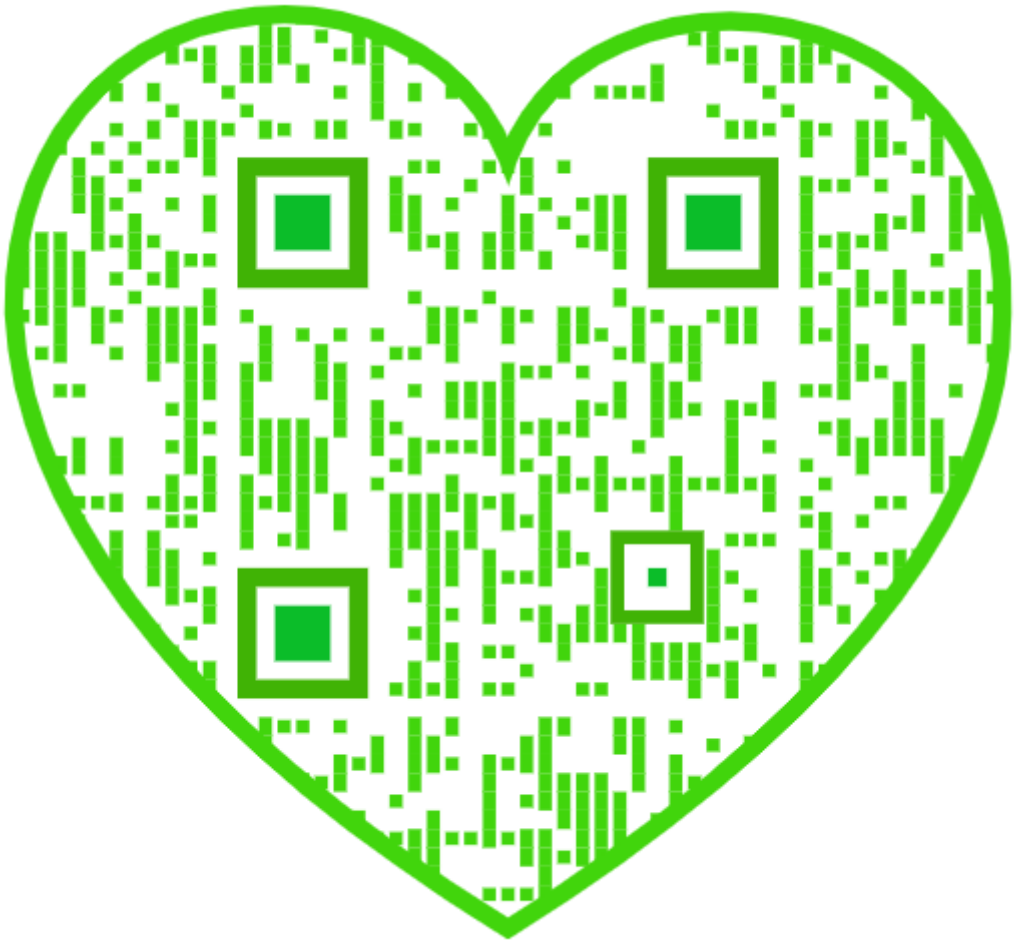

NOTES ON MILITARY AND NAVAL AFFAIRS.

The good news continues to come from all parts of the theater of war, and it looks as if the rebellion was really approaching its downfall.

FURTHER CONQUESTS OF COMMODORE DUPONT.

Commodore Dupont is extending his conquest along the coast, having taken possession of the towns of Jacksonville and St. Augustine on the eastcoast of Florida; securing with the latter place, Fort Macon, the second of the seized forts which has been restored to the government. On the 11th of March, Commodore Dupont sent Capt. Rogers ashore at St. Augustine, and he sought an interview with the authorities, who surrendered the city to him; the Mayor ordering the old flag to be displayed from the flagstaff of Fort Macon. Capt. Rogers says:—"I believe that there are many citizens who are earnestly attached to the Union, a large number who are silently opposed to it, and a still larger number who care very little about the matter. I think that nearly all the men acquiesce in the condition of affairs we are now establishing. There is much violent and pestilent feeling among the women. They seem to mistake treason for courage, and have a theatrical desire to figure as heroines. Their minds have doubtless been filled with the falsehoods so industriously circulated in regard to the lust and hatred of our troops. On the night before our arrival a party of women assembled in front of the barracks and cut down the flagstaff, in order that it might not be used to support the old flag. The men seemed anxious to conciliate in every way."

Lieut. Stevens had similar easy and peaceful success at Jacksonville. At this place the rebel general Trapier ordered a number of houses and saw mills belonging to Union men to be burned.

THE CAPTURE OF NEWBERN.

The capture of Newbern is the most creditable affair to our army of any that has yet taken place. The operations were planned by the Commander-in-Chief, and were executed by the coöperation of the army and navy in the most methodical and brilliantly-successful manner; the troops, in charging intrenchments defended by superior numbers, displaying a steady valor worthy of veteran soldiers.

Newbern is a town of about 5,500 inhabitants, situated at about the middle of the coast of North Carolina, on the south side of the Neuse river, a very broad stream which flows southeasterly into Pamlico Sound. The town is connected with Beaufort, about 40 miles to the southeast on the coast, by a railroad and turnpike, which run along very near the southerly bank of the Neuse. The rebels had planted batteries along the southerly bank of the river to prevent the passage of vessels, and had constructed intrenchments at two points across the railroad and turnpike to prevent the passage of land forces.

On Tuesday, the 11th of March, Major-General Burnside embarked about 8,000 troops which were at Roanoke Island on transports and gunboats under the command of Commander Rowan, and proceed to the Neuse river, advancing up the stream to within about 14 miles of Newbern. Early in the morning of the 13th, the troops were landed on the South side of the river, and took up their march for Newbern. The day was rainy, the roads muddy and the march exceedingly tiresome. In the course of the day the lower line of intrenchments was passed and found to be deserted. At 8 o'clock in the evening the army arrived within a short distance of the second line, which is only about two miles below Newbern. This is a breastwork, with a ditch in front, about two miles in length, extending from the river across the railroad far into the swamp at the south. The weary soldiers threw themselves upon the damp ground and slept through the night.

The next morning, Friday the 14th, the army moved forward in three divisions to attack the intrenchments. General Foster's brigade was ordered up the main country road to attack the enemy's left; General Reno up the railroad, to attack their right, and General Parke to follow General Foster and attack the enemy in front, with instructions to support either or both brigades. After the attack had vigorously commenced on the right and in front, General Reno made a detour to the left for the purpose of turning the enemy's right flank; not knowing that the breastwork extended so far into the swamp. The troops, however, when they came to the intrenchment, dashed through the ditch and over the breastwork; the principal portion of the enemy's force having been drawn near the river by the attack in that quarter. Four companies of the Massachusetts Twenty-First were far in advance of the other troops in their entrance into the enemy's lines, and were driving the enemy before them, when they were suddenly assailed by an overwhelming force, which issued from a little ravine, and were driven back; loosing a few prisoners. They were quickly supported, however, by six other regiments, when a sharp, hand-to-hand conflict took place over the breastwork, in which our principal loss occurred. Our troops succeeded in getting in, driving the enemy before them at the point of the bayonet.

This success encouraged our division on the right, which also rushed forward to the charge, and a general flight of the enemy ensued; a portion of the rebel soldiers jumping into the cars of a train that stood ready to receive them, while the others ran up the Trent to a country bridge which crosses the stream above the town. After those in the cars crossed the railroad bridge over the Trent, they set the bridge on fire to prevent our soldiers from following them into Newbern.

In the mean time our gunboats were sailing up the river, and driving the rebels from their batteries. As each fortification was approached, a few shells were dropped into it, when the soldiers of the garrison quickly scattered into the pine woods in the rear. The most formidable obstacle to the passage of the fleet was encountered nearly opposite the entrenchments, where the land battle took place. At this point 22 vessels had been sunk in one channel of the river, while the other channel had been filled with iron-tipped masts pointing down the stream, and with explosive torpedoes. Two heavy columbiads in a casemate also commanded the channel. But one of the columbiads was soon hit at the muzzle and dismounted; and the fleet sailed right through the obstructions without receiving any material injury.

The soldiers were ferried across the Trent in the small boats of the fleet, and took possession of Newbern. The retreating rebels set fire to the town, but the loyal inhabitants soon extinguished the flames with the aid of our troops.

General Burnside in his official report says:—"By this victory our combined force have captured eight batteries, containing forty-six heavy guns and three batteries of light artillery of six guns each, making in all sixty-four guns; two steamboats, a number of sailing vessels, wagons, horses, a large quantity of ammunition, commissary and quartermaster's stores, forages, the entire camp equipage of the rebel troops, a large quantity of rosin, turpentine, cotton, &c., and over two hundred prisoners.

"Our loss, thus far ascertained, will amount to ninety-one killed and four hundred and sixty-six wounded, many of them mortally. Among these are some of our most gallant officers and men. The rebel loss is severe, but not so great as our own, they being effectually covered by their works."

ADVANCE ON THE POTOMAC.

On the 17th of March Gen. Shields, belonging to General Banks's column, advanced from Winchester to Strasburg, driving the enemy out of the latter place, and following him three miles beyond.

OPERATIONS AGAINST ISLAND NO. 10.

After the evacuation of Columbus by the rebel troops it was given out that a stand would be made at Island No. 10, which lies in a bend of the Mississippi river above New Madrid, which was taken by the Federal forces under Gen. Pope. Commodore Foote's fleet of gun and mortar boats moved down and commenced to bombard the rebel fortifications on the island on the 17th inst., and were hammering away at them when we went to press. The resistance made at this point is more formidable than has been shown elsewhere, but its capture is only a question of time, if it is not already accomplished. Commodore Foote will hold on steadily until opposition gives way, and he will then push on down the river. Gen. Pope captured New Madrid after a brief engagement, the enemy fleeing in every direction, leaving behind several cannon, an immense amount of ammunition, military stores, &c, of great value. An attack was made on his works by rebel gunboats, but they were driven off.

The Working of the "Monitor."

The following letters will doubtless be read with interest at the present time:—

NEW YORK, March 15, 1862.

MY DEAR SIR:—It may safely be asserted that the *Monitor* is the best ventilated vessel afloat. The blowers draw in from the external atmosphere upwards of four thousand cubic feet of fresh air in every minute, part of which passes through the boiler furnaces and part through the entire vessel. The trouble during the passage to Fortress Monroe was caused by the sea breaking over and passing into the ventilating trunks, these not being made high enough.

There appears to be a general misconception of nearly every important point relating to the impregnable battery. The most serious error is the assumption that its power was fully developed during the contest at Hampton Roads. The power of the guns alone was tested. With guns of such caliber as the structure was made to bear, the *Monitor* would sink the *Merrimac* or the *Warrior* in the first round. Yours, very truly, J. ERICSSON.

UNITED STATES STEAMER "MONITOR,"
HAMPTON ROADS, March 12, 1862.

On Sunday last we met the *Merrimac* at fifteen minutes past nine, A. M., and after a hard fight of four hours, drove her back to Norfolk. Our noble and gallant captain was wounded near the close of the fight, and I was called on to take command of the vessel. Up to that time I had fired every gun myself, and had the satisfaction of knowing that I put five shot of 170 pounds straight through this infernal machine, and wounded her captain.

Lieutenant T. O. Selfridge (Lieutenant Jaffers has since taken command) is at present in command, and as soon as the *Merrimac* makes her appearance we are going to lay this battery alongside of her and stay there until one or the other sinks.

Our vessel is a complete success, and we are not materially damaged. We received twenty-one shots.

LIEUTENANT S. D. GREENE,
Executive Officer of the *Monitor*.

Capt. Ericsson's Remarks on the "Monitor."

After the news was received in this city of the battle between the *Merrimac* and the *Monitor*, a meeting was called of the Chamber of Commerce to consider the harbor defences of New York. Capt. Ericsson was invited to attend, and, after some discussion of the subject of the meeting, was called upon for his views of the dangers of New York from the *Merrimac*.

Capt. Ericsson, upon rising, was received with a flattering welcome. He said he was quite satisfied to tell them that he had received a letter from Chief Engineer Stimers, containing the first reliable information they had got of the engagement between the *Monitor* and the *Merrimac*, from any one on board the *Monitor*. He had taken a hasty copy, having sent the original for publication, as the Press had taken such a deep interest in the matter. The letter was written two hours after the battle on Sunday. He then proceeded to read the letters as follows:—

IRON-CLAD "MONITOR,"
HAMPTON ROADS, March 9, 1862.

MY DEAR SIR:—After a stormy passage, which proved this to be the finest sea boat I was ever in, we fought the *Merrimac* for more than three hours this forenoon, and sent her back to Norfolk in a sinking condition. Iron clad against iron clad. We maneuvered about the bay here, and went at each other with mutual fierceness. I consider that both ships were well fought; we were struck twenty-two times, pilot house twice, turret nine times, side armor eight times, deck three times. The only vulnerable point was the pilot house. One of your great logs (9 by 12 inches thick), is broken in two. The shot struck just outside of where the Captain had his eye, and it has disabled him, by destroying his left eye and temporarily blinding the other. The log is not quite in two, but is broken and pressed inward 1½ inches. She tried to run us down and sink us, as she did the *Cumberland* yesterday, but she got the worst of it. Her bow passed over our deck, and our sharp-upper-edged side cut through the light iron shoe upon her stern, and well into her oak. She will not try that again. She gave us a tremendous thump, but did not injure us in the least. We are just able to find the point of contact.

The turret is a splendid structure. I don't think much of the shield, but the pendulums are fine things, though I cannot tell you how they would stand the shot, as they were not hit.

You were very correct in your estimate of the effect of shot upon the man on the inside of the turret, when it was struck near him. Three men were knocked down, of whom I was one, the other two had to be carried below, but I was not disabled at all, and the others recovered before the battle was over. Capt. Worden stationed himself at the pilot house, Greene fired the guns, and I turned the turret until the Captain was disabled, and was relieved by Greene, when I managed the turret myself, Master Stodden having been one of the two stunned men.

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Capt. Ericsson, I congratulate you upon your great success. Thousands have this day blessed you. I have heard whole crews cheer you. Every man feels that you have saved this place to the nation by furnishing us with the means to whip an iron-clad frigate that was, until our arrival, having it all her own way with our most powerful vessels.

I am, with much esteem, very truly yours,

ALBAN C. STIMERS.

Capt. J. Ericsson, No. 95 Franklin street, New York.

Iron Sides and Wooden Walls.

It is said the Secretary of the Navy has been deceived by ignorant naval architects in the matter of iron-clad ships. Read the following bit of history published eighteen months ago in the London *Quarterly Review* on the above subject, and it will at once be patent to any one that such ignorance on the part of naval architects is wholly inexcusable.

As long ago, says the *Review*, as 1845, the late Mr. Stevens, the designer and builder of some of the best and speediest American steamers, made a long series of experiments at the expense of the American government, to ascertain and measure the resistance of iron plates to shot and shell. The result then arrived at was that plates less than an inch in thickness would resist the impact of any shell then known, and that a thickness of six inches of iron was impenetrable to every projectile that was brought against it, no matter how great the velocity, or how short the distance at which it was fired. These results were freely communicated to scientific men, both in Paris and in London, by Mr. Stevens in his visits to those capitals. Here they fell on stony ground, but in Paris they were followed up, and when the Crimean war broke out the Emperor Napoleon III., who, like his great uncle, has always been a great artillerist, and is skilled in the theory of projectiles, brought his knowledge to bear on the subject, and designed a class of iron-plated vessels known as the floating batteries of 1854. The French built six of these, and as we were requested by our ally to do otherwise, we literally copied his design without any alteration, but we did so most unwillingly, and our vessels were not ready in time to be of any service. The French batteries, however, were actually employed in the reduction of Kinburn, and with a degree of success which the most sanguine could hardly have anticipated. Although under the fire of heavy guns for a considerable time, they came out absolutely scathless, having answered in every respect the purposes for which they were designed. We never used ours and did not like them, and they were left to rot. The case, however, was widely different in France, and it is most curious and should be most instructive to observe the opposite courses which naval architecture has since taken in the two countries. It might be imagined *à priori* that from the moment this great discovery had been made in naval construction, and had been established by experience, our Admiralty would have seen at once how enormous were the advantages we might promptly derive from it, and how much more the discovery was calculated to establish our supremacy at sea than to give any advantage to France.

Lubricators for Bullets.

Formerly, tallow combined with wax was generally used as the lubricating composition for cartridges. It answered very well when the old brown-bess musket was in general use, but since the rifle has become the general weapon of the soldier, this lubricating compound has proved to be unfit for cartridges. When tallow is kept in contact with a lead bullet it exerts a carroding action on the metal and a crust forms on the bullet thus increasing its size and rendering it incapable of being rammed down, with ease and rapidity in a rifle. It has been found that paraffine does not exert any chemical action upon the lead, and hence it is now very generally employed as the best cartridge lubricant. It is one of the products of petroleum and coal oils.

EXTRACTION OF BUTTER.—M. J. A. Barrad writes in *Cosmos* that the time required for the formation of butter varies very much with the temperature. Near 54° Fah. it requires ten times longer than at 68°. But when the temperature is too high, the yield of butter is much diminished. The best temperature for getting butter from milk is between 60 and 68°. The losses are much less when cream is churned in place of milk. The best temperature for getting the most butter from cream, and in the least time, too, is between 57 and 61°

The British Iron-Clad Fleet.

The following is a report from the London *Times* of remarks, made on the 29th of January, in the House of Commons, by Lord Clarence Paget, on iron-clad vessels built, and building for the British navy. Some very interesting information is also given to show that the *Warrior* is not a failure as has been reported. For want of space this article was omitted in our last. Lord Paget said :—

We have now in the course of construction 15 iron-cased ships built and building, of which there will be, we hope, 11 afloat in the course of the present year. In the course of 1863 there will be 12 afloat—that is, one more—and in 1864 there will be 15, and, in addition, there will be a new ship, provided the Committee agree to the construction of this novel ship, to which I will presently allude. The first class of ships, including the *Agincourt*, the *Minotaur* and the *Northumberland*, were agreed to last summer; they are in process of building, and they will be ready in 1864. They are 400 feet long, and it is expected they will attain a speed of 14 knots an hour. They will be of 6,621 tuns. These ships are of a peculiar build, as they carry their plating right round. The *Warrior* and other iron ships are only partially plated up to a certain distance from the bow and stern, but these vessels of the largest class are to be plated right round. The next class comprises the *Warrior*, the *Black Prince* and the *Achilles*. They are partially plated, are of 6,100 tuns, and have a speed of 14 knots. The next class of ships comprises the *Hector* and the *Valiant*, each of 4,060 tuns, with a speed of 12 knots. The next class includes the *Resistance* and the *Defence*, which are of 3,668 tuns, and have a speed of 11.45 knots. The next class is that of the *Prince Consort*, the *Ocean* the *Caledonia*, the *Royal Alfred* and the *Royal Oak*; which were begun as line-of-battle-ships, which are now being converted to iron-plated frigates, and which are to be plated right round. Their tunnage is 4,045. They are wooden line-of-battle ships, and they are to be lengthened 10 or 15 feet. The *Prince Consort* and the *Caledonia* will have engines of 1,000-horse power and an estimated speed of 12.41. The *Royal Alfred* and the *Royal Oak* are of the same tunnage, with 800-horse power and a speed of 11.52. Every one will remember the controversy with regard to the construction of Captain Coles's cupolas. Last year we carried on a series of expensive experiments with one of these cupolas. We put it on an old floating battery; we tried firing from it, and then we tried firing at it; and the result was that it stood the most complete hammering without showing any considerable signs of weakness. The Admiralty were so impressed with this that they have since gone carefully into the matter, and we are now preparing a double cupola, to carry two guns. And we are now proposing to construct a ship which shall carry six of these cupolas. She is to be of 2,529 tuns, of 500-horse power, and will carry 12 breech-loading Armstrong 100-pounder guns in these six cupolas. Her length is to be 240 feet, and her draft of water 20 feet. It is very important to consider whether we cannot construct efficient armor-plated ships of considerably less draft, and we propose to try the experiment with Capt. Coles's vessel. She will have no masts whatever, and will trust entirely to steam. Rigging is out of the question, as it would deprive her of room for training her guns. She is intended for coast defence, and if she proves serviceable she will have this great advantage over other vessels—that her cost will be much less. Every body knows what weather the *Warrior* had to go through. Capt. Cochrane describes it as terrific. It was so very bad that even that noble vessel had to lay to. Such was the awful sea, that had she exceeded the rate of four knots an hour her bowsprit would have gone under. In spite of the gale, however, she arrived safely at Lisbon, with the exception of some trivial accidents. A vessel that could go through such a trial is fit to go round the world. It has been said, however, that she will not steer properly. It is quite true that such was the case. In her construction a detail of immense importance to the ship was neglected. The yoke was fitted in such a manner that she had not sufficient play for her helm. In ships we usually give 36 degrees each way for the helm to move in; that is a quadrant of 72 altogether, but in this case only 26 degrees each way were allowed. It was only natural, therefore, that the *Warrior* could not answer to her helm; but that is the only serious defect in the vessel. I had the pleasure of being on board of her on her first cruise, and I must say she was the most wonderful vessel in which I ever put to sea. No doubt, in the trough of the sea she has a tendency to roll; but she is fit to go any where in the world. [Hear, hear.] I have made these remarks because there are several sinister reports abroad on the subject which I believe are totally without foundation. [Hear, hear.] A series of experiments is to take place next week, which will, in a great measure, determine the future of our iron fleet. Our present vessels, as you are aware, carry 4½-inch armor plates, backed by 18 inches of teak. But we are going to make some experiments on Captain Coles's vessel, to test the value of three proposals which have been submitted to us. Mr. Fairbairn declares that the wooden backing is disadvantageous, for it is liable to decay, and, owing to its thickness, interferes with the training of the guns. He proposes that we should have the armor bolted on to iron plates instead of wood. Next comes Mr. Scott Russell, who says Mr. Fairbairn is right, as far as he goes, but that bolt holes weaken the plates, and who, accordingly suggests a system of clamping between the plates, by which that defect may be obviated. Lastly, Mr. Samuda insists that there is no necessity for the iron backing at all, and that it would be much better to have thicker plates—say of five inches, and make them part of the sides of the ship. Which of these gentlemen is in the right will be shown by our experiments.

THE London *Star* has an editorial on Cyrus W. Field's mission to England about resuscitating the Atlantic telegraph scheme. It urges the British government to encourage the enterprise, and it is understood this will be done. An important meeting of the stockholders of the old Telegraph Company has been held in London to take measures to lay another cable.

Mode of Coloring Horn White, Yellow and in Imitation of Shell.

We find the following article by M. Mann, in *L'Invention* :—

Of all the modes employed for coloring horn, there are none which give in a satisfactory manner, white yellow and shell color. These methods consist almost exclusively in the combination of lead, mercury or silver, with the sulphur contained in the horn, and produce scarcely any tints except those comprised between black and a reddish brown.

Coloring horn white, by means of methods analogous to those which are known, has not been possible either for want of suitable apparatus, or because it is more difficult than the indirect process to which the author has been conducted by his experiments. He has recognized that several other metallic combinations may be fixed in the substance of the horn, which permits the production of very varied colors.

To make horn white, the author first colors it brown with minium by the ordinary method; he then decomposes the sulphide of lead formed, with hydrochloric acid free from arsenic or the oxide of iron. There is disengaged sulpho-hydric acid—recognizable by its odor—and there is formed the chloride of lead, which remains in the horn in the state of a white deposit. This chloride gives a beautiful shade of milk color, and takes a fine polish. When the operation is conducted with care success is certain. The more transparent the horn the purer is the white. This method may be employed in the manufacture of many objects, especially in that of combs and buttons.

It is evident that having fixed the chloride of lead in the horn, we may obtain by decomposing this salt a variety of shades.

Chromic acid decomposes the chloride of lead, expelling the chlorine and giving a yellow of the most beautiful tint. The author plunges the horn—previously made white—into a solution of the bichromate of potassa, and obtains immediately the yellow color. By this process the color of wood may also be imitated, which adapts it to the need of cane makers and turners.

To obtain the shell color, the horn is first dyed brown and then plunged cold into very dilute hydrochloric acid when it almost immediately takes the silvery tints characteristic of shell. The structure of the substance renders the imitation striking, and as experienced eye is scarcely able to distinguish brown shell from horn thus prepared. This last method in particularly adapted to the manufacture of buttons.

Estimated Amount of Revenue from Taxation.

Mr. Morrill, in the course of some remarks upon the new Tax Bill, recently reported in the House of Representatives, presented the following summary of the amount of revenue to be derived under it. He said :—

No duty was designed on literary or scientific works or newspaper publications. On printing paper, like any other manufacture, a tax of three mills per pound is proposed—equal to three per centum *ad valorem*, or less than half the amount on writing paper. He said he estimated the amount of internal revenue as follows: Ale, beer and other malt liquors, four millions of barrels, $1,000,000; spirits, one hundred millions of gallons, $15,000,000; licenses of all kinds, $3,000,000; linseed oil, lard oil, &c., $600,000; candles and soap, $1,500,000; petroleum and coal oil, $2,500,000; leaf tobacco, loyal states and foreign, two hundred and eight millions of pounds, $5,000,000; manufactured tobacco, snuff and cigars, sixty millions of pounds, $3,000,000; boots and shoes, $2,500,000; hats, caps, bonnets, clocks, shirts, umbrellas, &c., $2,000,000; paper, $1,000,000; leather, $1,000,000; paints, painters' colors, ink, &c., $1,000,000; coffee, ginger, allspice, &c., $500,000; starch, $500,000; salt, $225,000; refined sugar and sugar made from molasses, confectionery, &c., $500,000; gas, $1,000,000; rectified and adulterated spirits, wines, vinegar, &c., $1,000,000; slaughtered cattle, sheep and hogs, $500,000; railroads, ferries, steamboats and omnibuses, $6,000,000; watches, plate, carriages, piano-fortes and billiard tables, $2,000,000; rail road bonds, $1,000,000; banks and savings institutions, $800,000; advertisements, estimated forty millions gross, $2,000,000; income duty, $5,000,000; stamp duty, express companies, excluding patent medicines, $6,000,000; patent medicines, stamps, $2,500,000; legacies and distribution, and shares of personal estate of deceased persons, $1,000,000; salaries, say forty millions, $1,200,000; manufactures not included, $30,000,000. Total from internal revenue, $101,925,000; from direct tax, $12,000,000, and revenue from imports, $50,000,000. Aggregate, $163,925,000.

VARNISHING CHEESE.—A writer in the *Prairie Farmer* states that it is the practice of some dairymen to coat each cheese thinly with a varnish made from shellac dissolved in alcohol, when about to be shipped for market. It is said to improve the appearance of the cheese, and to keep it from losing weight and gathering mold. We cannot say as to the value of this recommendation.

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A New Patent Washing Machine and Wringer.

The accompanying engraving illustrates another alleged improvement in machines for washing clothes and an apparatus for wringing them from the suds, secured by separate patents to the same inventors. The patent of the washing machine bears date Feb. 25, 1862, and the wringing machine was patented March 4, 1862.

The washing machine consists of a swinging board, *a*, and a stationary board within the tub—not shown in the cut—between which boards the clothes are repeatedly pressed, in the suds with which the tub is filled. The swinging board, *a*, is corrugated and the stationary board in front is formed of slats with openings between them for the passage of the suds. The board, *a*, is swung back and forth by means of the lever, *b*, with which it is connected by means of toggle levers, as shown. The lever, *c*, is provided for the hand of an assistant in case one should be required. An ordinary rubbing board, *d*, is secured in the front end of the suds box, for cleaning by hand any portions of the clothes which may not have been thoroughly washed by the operation of the machine.

GILL, PALMER AND WEBB'S WASHING MACHINE AND WRINGER.

The clothes wringer is of the class in which the water is pressed out of the clothes by passing them between two elastic rollers, and the patent consists in the mode of fastening the wringer to the tub. The rollers, *e* and *g*, are formed of india rubber or other elastic material, and are secured to the edge of the tub by two pairs of jaws of a novel character. The two pairs of jaws are precisely alike, and the description of one will answer for both. The outer jaw, *f*, forms a portion of the rod upon which the rollers are secured, the rod being bent at the proper angle to allow the jaw to fit the outer side of the tub and to carry the rollers over the edge of the tub so that the water expressed from the clothes will fall back into the tub. The journal of the lower roller, *e*, is cast upon a collar, which fits the rod loosely, and upon the under side of the same collar is a projection which forms the inner jaw. It will be seen that a pressure of the upper against the lower roller will cause the jaw to gripe the edge of the tub. This pressure is obtained by screwing a thumb nut upon the end of the bar; an india-rubber spring being interposed between the nut and the journal box of the upper roller. By this thumb screw the pressure of the rollers together is also adjusted, the same operation serving to fix the apparatus to the tub and to adjust the pressure of the rollers upon the cloth which passes between them.

Patents for both inventions were granted through the Scientific American Patent Agency, and further information in relation to either of them may be obtained by addressing the patentees, Gill, Palmer & Webb, at Alton, Ill.

HISTORY OF TURBINE WATER WHEELS.

Number II.

It has been formerly stated that the superior effects obtained from admitting the water to reäction wheels in a direction coinciding with the motion of the wheel, was a discovery made by the brothers Z. and A. Parker, and resulted from a peculiar accident. Their first successful wheel gave them encouragement to make a set of working models, both vertical and horizontal, and they made a series of experiments which greatly extended their knowledge, and enabled them to calculate with more certainty, the size and form of the issues in proportion to the quantity of water and hight of fall. Their saw mill which had proved a failure with the old wheel was then reärranged, the wheel taken out, rebuilt, and the guides so formed as to give the water a vortical motion in the right direction. This wheel when started, operated to their entire satisfaction. These labors and experiments were performed between 1825 and 1829, and a patent was obtained by the inventors for their wheel, in October of the latter year. As some disputes have arisen respecting the claims of several American inventors, and some European inventors relating to the invention of the vortex principle in water wheels, we will describe the principle, and give the claims of the first Parker Patent.

"The principle upon which this improvement is founded is producing a vortex within reäction wheels, which, by its centrifugal force, powerfully accelerates the velocity of the wheel and adds proportionably to its momentum." The claims are, "First, the compound vertical percussion and reäction wheel for saw mills and other purposes, with two, four, six, or more wheels on one horizontal shaft; the concentric cylinders inclosing the shaft and the manner of supporting them, the spouts which conduct the water into the wheels from the penstock with their spiral terminations between the cylinders.

"Second, the improvement in reäction wheels by making the buckets as thin at both ends as they can safely be made, and the rim no wider than is sufficient to cover them; the inner concentric cylinder; the spout that directs the water into the wheel and the spiral terminations of the spout between the cylinders.

"Third the rim and planks that form the apertures into the wheel, and the manner of forming the apertures; the conical covering on the blocks, with the cylinder or box in which the shaft runs, and the hollow gate in any form, either cylindrical, square, or irregular."

It is claimed by Mr. Parker, that the patent embraced principles which have been applied to a greater or less extent in every good reäction wheel since constructed in the United States. At the time it was issued, there existed a general ignorance of the action of, and a great prejudice against, all water wheels but the overshot and breast, and Dr. Jones, who was then editor of the *Journal of the Franklin Institute*, and held a situation in the Patent Office, gave public expression of his opinions unfavorable to the new wheel. Several years subsequent to this, however, a committee of the Franklin Institute investigated the subject, made experiments with the Parker wheel, and presented a favorable report upon it, which was published in 1847.

After Messrs. Parker had succeeded in introducing their wheels extensively in Ohio, they still found that a great hindrance to their more general application and success was the rapid wearing of the steps of those secured on vertical shafts. They also found a difficulty connected with those secured on horizontal shafts, by their cranks striking the tail-water of the wheels as they revolved. These evils seemed insurmountable for a long time, but at last Austin Parker (long since deceased), the younger brother, conceived the idea of placing a wheel in a "draft box," and applied it to a saw mill in Trumbull county, Ohio, as early as 1832. It was used on this wheel for quite a number of years, and is, perhaps still employed in the saw mill. The "draft box" consists of an air-tight case in which the wheel or wheels are secured, and by the water expelling all the air, the benefit of a vacuum is secured under the wheel placed at any hight between the tail-race, and the top of falls equal to 33 feet. This was perhaps the greatest improvment ever made in the application of reäction wheels. This invention remedied the evil of the crank striking in the tail race, as wheels which previously were all secured as low down as possible to get the entire pressure of the water, were now raised to any convenient hight above the race. The pressure on the steps of vertical shafts was also removed by admitting the water from the lower sides of the wheels. The patent for this admirable invention was long delayed after it was first applied for, on account of the death of the inventor, Austin Parker. It was issued June 27, 1840, to his brother Zebulon, and Robert McKelvey, administrator of his estate. The claim in the patent for this invention is as follows:—

"What is claimed as new in the above-described improvement on the percussion and reäction wheel as originally patented by Zebulon and Austin Parker, is the placing of the said wheel or wheels, or wheels analogous thereto in their construction and mode of operation, within air and water-tight cases or boxes herein denominated Drafts, substantially in manner and for the purposes above set forth."

This patent was the first on record for the draft box applied to wheels. If the admission of water in a whirling direction to reäction wheels, coinciding with that of the wheel's motion, constitutes a true turbine, then the brothers Parker were the inventors in America of both turbine wheels and draft boxes. The next article will give some account of the application of such wheels in Europe.

Bread from Heated Wheat.

Wheat which has been exposed to moisture and a fermenting temperature and has become heated, has always been considered completely ruined for making bread. If it is dried and converted into flour, and subjected to fermentation, the dough will not rise, and if baked, it will not make spongy, light bread. The cause of this is the conversion of the gluten in the wheat, by its germinating action, from an insoluble into a soluble substance and the consequent destruction of its elasticity.

Some new light has lately been thrown upon this subject by Prof. Nichels, France, who has made a series of experiments with such heated wheat. He states that common salt possesses the quality of restoring the soluble gluten of germinated wheat to its original elastic condition, and that good bread may be made from it by adding 4 ounces of salt to every 13 lbs. of the flour. This information, if entirely reliable, is of great importance, because thousands (and perhaps millions) of bushels of wheat are annually injured by water and heating, when transported in bulk on our lakes and canals. Such wheat sells in New York and other places for a very few cents per bushel. It is chiefly used for making starch.

Iron Vessel for the British Navy.—We learn from the *Engineer* that no more wooden ships are to be built for the British navy. Hereafter, every vessel is to be built wholly of iron, or of wood plated with iron. The Admiralty officials "have made up their minds," says our cotemporary, "to devote their energies to the development of sloops and gunboats of an indestructible and incombustible character."

The total product of copper in the Lake Superior copper mines, in 1861, was 3,460 tuns and 731 lbs.

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The Cultivation of Flax.

The Canadian *Agricultural Review* contains a lecture lately delivered at Sherbrooke, by Mr. P. McCudden, from Cavan County, Ireland, who seems to be practically acquainted with the whole subject of cultivating and treating flax. As many of our farmers design to initiate the cultivation of flax this season, all useful information on the subject is of great importance to them. We have, therefore, condensed this lecture, leaving out the less important statements, to render it more general in its application.

Flax has long been known to thrive well in the United States and Canada, but by far the most valuable portion of it has been thrown away and allowed to rot on the manure heaps, possibly owing to a want of knowledge respecting its real value and usefulness, or from a want of facilities to treat and prepare it at the proper season. The soil and climate of this country are admirably adapted for the growth of flax. From a commercial or manufacturing point of view the advantages to be derived from the culture of flax appear to be very great. In the old country the proper cultivation of a moderate patch of land laid down in flax has enabled a family to live in comfort during recent years, because the price of the article has been so high.

The following extract, taken from the prospectus of a company formed in Belfast, to encourage the growth of flax in East India, will show the great scarcity of that article, and the length they have gone to look for a very equivocal supply, at the very antipodes :—

The linen trade, at its seats of action in Leeds, Dundee and Belfast, and their manufacturing dependencies, has, for some time past, been suffering severely from the extreme scarcity of flax, and the inquiries instituted with the view of opening up extended sources of supply have forced on the minds of manufacturers that it is vain to expect from the present sources the quantity of fiber necessary to meet the growing requirements of the trade.

Independent of this crop being the most remunerative, it enters into the best regulated system of rotation, a thing much to be desired by every practical armer. Flax loves to luxuriate on a well-drained tlay subsoil, with rich surface soil properly pulverized. It yields the largest and best quality of fiber when it follows a crop of wheat or oats immediately out of lea, but may be sown with success on more worn ground. It has been found from experience that the proper time for sowing is from the first to the twelfth of May, a period very suitable for the sowing of clover and grass seeds, when those delicate seeds will have no difficulty in quickly germinating, or their growing progress retarded by frost, when earlier sown ; it is, therefore, considered the safest and best crop for laying down land with those essentially useful seeds. Clover has been properly styled the farmer's sheet anchor, and from the preparation that is needed for the due development of flax a heavy crop of clover is the general result. Those intending to grow flax will at once see that much depends on the condition of the land, and it is highly necessary, to insure a good crop, to have it perfectly free from any foulness. No crop is more generous in its return for care bestowed on it than flax ; we should be particular in doing every thing connected with it well. When not intended for laying down, but to be followed by fall wheat, it will be off the ground in time for that purpose, as it occupies the least time of any crop in coming to maturity. As flax requires but a very slight covering, all unevenness in the ground should be removed by the harrow, and if the weather has been previously dry, rolling before sowing will pulverize the small lumps, and tend much to have an even and productive crop.

Holland seed is the best for clayey soils, and Riga for loose friable soils. About seven pecks of seed to the acre is the proper quantity, and should be sown broadcast. When the plants have attained to a hight of six or eight inches they should be weeded by hand. They will then require no further care until the time of pulling.

Breaking Heifers for Milking.

The *American Agriculturist* gives the following good advice, which may be put into practice during the next month in many thousands of cases :—

This is often made quite a serious affair, in which kicks and bruises are freely interchanged between the frightened brute and the irritated master. Many an otherwise excellent milker isspoiled for life by harsh treatment. A heifer, if well broken to the milk pail, will pay for much painstaking. Rarey's reasoning respecting horses applies equally to other animals. They only resist when injury is apprehended, and their natural instinct suggests danger whenever any unusual treatment occurs. Every one has noticed how shy a creature is in entering strange inclosures, or at sight of new objects. The handling of a heifer's bag is to her a very unusual proceeding, and in addition, the teats are often tender, and the bag caked and inflamed so as to be painful under even a gentle touch. Training for milking should commence long before calving. First teach the animal to welcome your coming by an apple, a handful of corn, or salt or other delicacy. She will soon readily permit the hand to be laid upon her back and enjoy the gentle rubbing and scratching which may be given. Extend the handling to different parts of the body, until she will not flinch from grasping her teats, and the work may be soon accomplished without a harsh word. This will be a good lesson for the boys to practice and it will teach them patience and kindness, in addition to the good effects upon the animals.

Grape Vines for City Gardens.

The Baltimore *Rural Register* on this subject says:—We have two vines, which we can recommend with confidence, viz., the Catawba and the Isabella ; but superior in some respects to both of these is the Diana—a white grape, or rather of a light amber color. This grape is not surpassed in point of hardiness, and has received the most unqualified commendation of the best vine growers at the North. Another grape, and second only to the Diana, is the Concord. It is hardy, prolific and of good flavor. We have grown also for some years the Clinton. It is a small grape, bears early, and sets an abundance of fruit, but the quality to our taste is inferior to any of the others we have already mentioned.

Now, as to the manner of starting cuttings. So soon as the ground is in good condition in the spring break it up well and deeply with the spade ; we always trench our beds for this purpose. When the spading is finished, cut a trench across the bed six inches deep, one edge of the trench being sloped at an angle of forty-five degrees. Against this slope the cuttings are to be placed six inches apart, leaving but one, or at most, two eyes above ground—two eyes being below the surface and the lowest eye being close to the lower end of the cutting, the stem being cut clear across horizontally at that point and not slantwise. When the cuttings are placed six inches apart against the slope of the trench, pack the earth well to them, and level with the spade. At a distance of eighteen inches from this trench dig a second, and so proceed until the whole number of cuttings are planted. Should the season prove dry before the roots have gained strength, water the bed heavily, so as to moisten the soil to a good depth, and if the whole bed is mulched with loose litter the moisture will be longer retained in the soil and the young vines will start and grow vigorously, even in the hottest summer weather.

Sawdust in Manure.

F. J. Kinney, of Wayland, Mass., gives, in the *New England Farmer*, an interesting account of his use of sawdust for bedding, as a fertilizer and absorbent.

In January, 1859, he commenced hauling sawdust and fine chips from a clothes-pin manufactory. There were two horses, seven head of cattle, and several swine on the farm ; and in course of the year he used 100 cords of this material as bedding for these animals. The stable floors were covered with it about six inches deep, and as fast as that under the swine and cattle became saturated with urine, it was removed with the solid excrement to the manure cellar. The horse bedding and manure were piled under a shed.

In closing his communication, Mr. Kinney remarks :—" Wherever I have examined the roots of a vegetable grown where sawdust, chip or leaves and stable manure had been used, I found them embracing with their delicate fibers every atom of the vegetable matter within their reach, and drawing their natural sustenance from them ; and there is nothing I have ever tried as an assistant fertilizer that holds so much liquid or retains it so long, where only the air and sun operate on it, as hard wood sawdust ; and nothing that yields up this embryo vegetable so readily to the petitions of the rootlets.

Cultivation of the Strawberry.

At a late meeting of the Fruit Growers' Association of Western New York, held in Rochester, the Rev. J. Knox, of Pittsburgh, Pa., a great strawberry cultivator, was present, and by request gave the following remarks, as reported by the *Rural New Yorker*, in regard to his practice with this fruit, to which he devotes fifty acres of land. He considers a rather light clay soil preferable to a sandy soil. The first work in its preparation is thorough drainage, next breaking up or pulverizing from twenty to twenty-four inches in depth. This is effected by the plow alone. First use an ordinary plow, with two horses, followed by a kind of subsoil plow, with two yokes of oxen. Give the ground several plowings in different directions until it is well broken up and pulverized. He could obtain two or three very good crops from land plowed in the ordinary way, eight or ten inches deep, but on that plowed two feet deep could get ten or twelve crops in succession. Strawberries do not require much manure. Any good wheat or corn land is good enough for them. Plant in rows thirty inches apart, and keep the plants ten inches apart in the rows, making twenty thousand plants to the acre. When he commenced strawberry culture he plowed between the rows, but latterly has discarded all implements except the hoe. Weeds are taken out by hand. The less the soil is disturbed after planting the better, as the whole ground is covered with a network of small fibrous roots. Never allow the vines to bear the first year after being planted, but pick off all the fruit stems and runners and remove the runners every year that the plant is fruited. He sets out plants early in the spring, and protects them in the winter by wheat or rye straw thrashed with the flail. The straw is removed in the spring and placed around the plants as a mulch. Two tuns to the acre is about the right quantity of straw to commence with, but after that one tun of new straw each season will answer. Varieties that succeed in some soils and situations fail in others. The strawberry season ought to be lengthened. It is usually about three weeks, but with proper selections can be extended to five weeks.

For a general crop, " Wilson's Albany " and " *Triomphe de Grand* " are the most profitable. The latter is the strawberry of all strawberries, and possesses all the excellencies that can be desired—productive, beautiful, large, of fine quality, berries shipping well, and the plants are hardy. It is not as productive as the " Wilson," but an acre will bring more money. Mr. Knox, sent them to Cleveland, Chicago, Philadelphia and New York, and received orders from New York alone for more than his whole crop. If confined to one kind of strawberry he would plant the " *Triomphe de Grand.*" Although not quite so productive as the " Wilson," he could say with safety that it produces more than 300 bushels to the acre. For putting up in cans, the " Wilson " is preferred. The only manure used is well-rotted stable manure. The same plant, if the runners are kept off, will bear ten years. A good many crowns will start and cluster around the original plant, each bearing a fruit stem, and all producing a very large amount of fruit.

Purifying Air.

MESSRS. EDITORS :—Is there any practical way by which air can be purified or rendered fit for respiration, by recharging with oxygen after being breathed once, and what is the process? C. W.

St. Louis, Mo., March 6, 1862.

[There is a very simple and efficient way in which air can be recharged with oxygen. It is only necessary to open a window and let the air go out into the great ocean of the atmosphere. There chemical agencies are in operation on the largest scale, always busy in the work of purification. The carbonic acid which is expired from the lungs is decomposed by vegetation, or absorbed by snow and rain, and the animal matter that comes out with the breath is also carried down by descending water ; while every green blade of grass and every growing leaf is pouring out through the whole day its fresh supply of oxygen.—EDS.

VALUABLE IMPROVEMENTS IN SKATES FOR SALE.—By reference to our advertising columns it will be seen that a small capitalist desiring to engage in the manufacture of skates of a very desirable pattern, covered by two separate patents, has an excellent opportunity.

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THE ANCIENT SAVAGES OF EUROPE.

The week before last we gave an account of the evidences which have recently been discovered of the early existence in Denmark of a race of savages a little lower in the scale of being than the Indians who inhabited the eastern coast of North America at the time of the discovery of this continent, and just about on a par with the degraded Digger Indians of California. Like the ancient Danish savages, our Indians were unacquainted with the use of metals, and had not subdued the lower animals to their service; but the Indians on the Atlantic coast had made some feeble efforts to cultivate corn and tobacco, while the food of those on the Pacific consisted of roots, from which their name of Diggers is derived, and of other natural products, as acorns, grasshoppers and shellfish.

We now proceed to give an account of two periods previous to historic times, which succeeded the Age of Stone, and which are properly called the Age of Bronze and the Age of Iron; deriving our facts principally from Mr. Morlot's pamphlet mentioned in our article last week. Numerous evidences of the existence of these three ages have been collected by the archæologists of Europe, especially by Mr. Thomsen, of Copenhagen, and Professor Nilsson, of Lund, in Sweden, but the recent discoveries in Denmark have been made principally in the peat bogs of that country.

The peat bogs in Denmark are numerous and those of a certain class are small and very deep, frequently thirty feet or more. On examination they are found to be composed to a large extent of trunks of trees which have fallen into the depressions and filled them up; the tops of the trees very curiously all pointing inwardly toward the center. Some of the bogs are so small that the trees upon opposite sides reach to the center and overlap, while others are of too great extent for this, and the central portion of these has been filled by a smaller class of vegetation. The bottom—to the depth of one, two or three feet—is formed of clay, upon which is deposited a mass of amorphous peat formed of plants so broken and decomposed that the species cannot be determined. In the border of forest trees the bottom is found to be formed of gigantic pines, next above are oaks, and lastly beeches. This change in the vegetation is supposed to be due to improvement in the soil, both in its dryness and its fineness.

The peat bogs contain innumerable remains of human industry, which tell with absolute certainty the story of three successive ages of stone, bronze and iron. No traces of man are found in the clayey substratum nor in the amorphous peat at the bottom, but commencing near the bottom of the pine stratum and extending upward into the lower edge of the oak, are numerous implements of flint, and some of the pine trees show that they were cut off by fire. Soon after the oak began to grow, the use of bronze was introduced, and there are reasons for believing that the art was brought by a superior and conquering race. The Age of Iron corresponds pretty nearly with that of the beech, which is the most common tree at the present time in the forests of Denmark.

The savages of the Age of Stone had subdued only one of the lower animals, the dog; but the barbarians of the Bronze Age had learned to breed the sheep, the ox, the horse, the hog and the goat. The utensils of bronze found in the oak stratum of the peat bogs are of a workmanship far superior to that of the flint implements of the Stone Age, and there are other indications of advancing civilization, from the earliest period of the Stone Age forward to that of iron.

Numerous relics of the three ages, Stone, Bronze and Iron, are found in other portions of Europe. Among the most remarkable of these are charred remains of piles and pieces of houses in the lakes of Switzerland. It is supposed that the ancient savages built their villages in the lakes for the better security against their enemies. Some of these villages were built in the Stone Age and others in that of the Bronze; a very few only belonging to the Age of Iron. This fact is fully established by the implements with which the bottoms of the lakes are strewn among the ruins of these ancient habitations. In the small lake of Mossedorf, for instance, in the ruins of a large village, hundreds of implements of stone, bone, horn and wood are found, but not the smallest vestige of any metal, either iron or bronze. In others bronze implements are abundant, and in a small number there are a few implements of iron.

The savages who inhabited Switzerland in the Age of Stone seem to have been a grade higher in the scale of being than those of Denmark. At Mossee-dorf charred grain has been found, indicating the practice of agriculture, and at Waugen the interesting discovery has been made of pieces of cord and shreds of tissue formed of a vegetable substance resembling hemp and flax; this proves the ancient cultivation of a textile plant. As these fabrics were plated and not woven, it would seem that the loom was not known to these people.

The stone implements found in Switzerland are inferior to those found in Denmark, but this is accounted for by the circumstance that there is no stone in Switzerland so suitable for this purpose as the flint of Denmark. Many of the implements found were made from stone which must have been brought from some other country, probably the south of France; showing the beginning of commerce in that age.

One of the most interesting facts developed by this investigation is the increasing size of the human race. By the skeletons, the sword handles, and other implements, it is plainly shown that the men of the Age of Stone were smaller than those of the Bronze Age, while those of the Age of Bronze were smaller than those of the Iron Age. The same is true of all the domestic animals, the sheep especially being so much smaller that none but skilled comparative anatomists would pronounce the ancient skeletons to be those of sheep.

Archæologists, in tracing back the history of our race, find man everywhere slowly emerging from the lowest state of savage life; with exceedingly circumscribed knowledge of the forces of nature and corresponding feebleness in control over them; poorly protecting himself by great toil from hunger and cold; and waging, during his short and miserable life, a doubtful warfare with the wild beasts to whom he seemed so nearly allied.

A SPLENDID SPECIMEN OF CALIFORNIA WORKMANSHIP---HANSBROW'S PUMP.

A few days since we had the pleasure of examining one of Mr. Thomas Hansbrow's double-acting pumps, intended for exhibition at the World's Fair in London. The cylinder, valve-box, air-chamber, plates and standard are of polished copper, mounted with silver, all secured to a slab of beautiful California black walnut. The cylinder of this pump is three inches in diameter and the stroke five inches. It is an exquisite piece of workmanship, and is a credit to the taste and skill of California mechanics. Mr. Hansbrow is one of Sacramento's first citizens, and he goes to London to represent the industry of the golden State of California as its Commissioner. This pump received the first premium last year from the State Agricultural Society of California, and the demand for it has been greater than the facilities of the manufacturer rendered it possible for him to supply. The valve-box is situated above the cylinder, and the valves are set upon an inclined plane; it is, therefore, not liable to leak or choke. Easy access is afforded to its interior for examining and packing the valves and piston, and its parts are few, simple and well arranged. It is eminently adapted for mines, ships and all other purposes for which small pumps are used. Although the variety of pumps is legion, we are confident that this one will receive deserved attention at the World's Fair. European patents have been applied for through the Scientific American Patent Agency, through which the American patent was obtained in 1861.

IMPROVEMENTS IN THE STEAM ENGINE.—The best steam engines, as at present constructed, yield only a very small fraction of the power of the heat resulting from the combustion of the coal. Our own calculations, taking for data the amount of water which has been evaporated by a pound of coal, show that only about $\frac{1}{10}$th of the power is utilized; but Cooke, in his Chemical Physics, a work of the very highest authority, going a step further back for his data, states that the very best engines yield but $\frac{1}{25}$th of the power of the coal. The direction in which improvements are now principally sought is in the use of very high pressure—500 pounds and upward.

TOO HEAVY SHOT FOR LIGHT GUNS.

Experience is the best, although oftentimes a sad teacher. Great advantages had been expected from light rifled guns using long heavy shot, in comparison with guns of similar caliber using spherical shot, and no doubt they have a much greater range. But the strain upon light guns firing long heavy shot is so great, that we have scarcely had a single engagement in which one or more of such guns have not burst. In the late attack by Com. Foote, upon Island No. 10, one of the rifled guns on board of the gun-boat *St. Louis* burst and killed two men outright, mortally wounded two and severely injured ten others. The havoc caused by this accident, was much greater than that by the shot of the enemy. The bolts used for our rifled cannon are too heavy. They are generally more than double the weight of sperical shot used for smooth bore guns. The friction of elongated shot in rifle guns is also much greater than round shot in smooth bored guns; this also increases the strain upon them. We advise the use of lighter bolts for our rifled cannon.

Waked Up at Last.

One of the daily papers announces that the Secretary of the Navy has authorized the commander of the Brooklyn navy yard to complete an iron-clad gunboat within the next sixty days. Very good, Mr. Secretary, but why on earth did you not do this soon after you came into power? If you had then ordered half a dozen such gunboats the brave tars who sank in the waters of Hampton Roads, while vainly fighting for their beloved flag, would be alive to-day, to defend it still. We have no personal quarrel with the Secretary of the Navy. We believe him to be an estimable man, but we want to save life and property, and, above all, our nation. It is our opinion that the Secretary is surrounded by a lot of old fogies, who have deceived him in this business of creating a navy.

The "Great Eastern."

This huge vessel seems destined to bring disaster on all who come near her. On leaving her moorings, lately, at Milford, in order to swing her round with the tide, a hawser attached to a boat from the frigate *Blenheim* got foul of her screw, and the boat's crew were sucked under. Two men were drowned. Soon after the hawsers that held her parted, and she drifted helplessly down the channel, striking the *Blenheim*, and carrying away her bowsprit, jibboom, mainyard and moorings, springing her foremast, and narrowly missing smashing a little steamer that happened to be close by. Mismanagement seems to reign in all her departments. It was with difficulty she was brought back and placed on the "gridiron." She deserves a good coasting for her misconduct.

The Concussion in the Turret of the "Monitor."

MESSRS. EDITORS:—In the account of the fight between the *Monitor* and the *Virginia* it is stated that three of the crew on board of the former were knocked down and stunned by the concussion caused by the shot of the latter striking the turret of the *Monitor*. Now, would not an extra thickness of plating, say one inch in thickness, placed on the inside of the turret, at a distance of say one inch from the outside thickness of eight inches (leaving a space between, filled with air), deaden or destroy this concussion?

CENCI BULL.

Hartford, March 14, 1862.

[We should suppose that it would be better to have the inner lining of wood, and the space between that and the wall of the turret filled with sawdust or ground cork.—EDS.

AN experiment is being made at the Manchester locomotive station of the Manchester, Sheffield, and Lincolnshire Railway, to employ metallic packing instead of hemp in the stuffing-boxes of locomotives. Small brass rings are applied (cut into segments) around the piston-rod, light springs being employed to keep the rings tight. It has long been necessary to keep two men at the station, one throughout the day and the other throughout the night, constantly employed in packing the locomotive piston-rods with hemp. At Crewe even this staff of packers is insufficient.

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PLUMBING AND SOLDERING LEAD PIPE.

The following interesting article on the art of plumbing and forming joints on lead pipes is condensed from the *Ironmonger* :—The tools necessary for the work comprise a hammer, chipping knife, drawing or strong clasp knife, a pair of compasses, chalk-line, file, pincers, cutting pliers, boxwood mallet with round taper head, chase-wedge, shave-hook, rasp, turnpin, dresser, wiping cloth, ladles and irons. Of course, a full plumber's kit would contain many more items to meet various contingencies, but those above-named will perform all ordinary work. Some of them are sufficiently well-known not to require description ; those that are peculiar to the plumber are the following :—

The shave hook is a sharp, triangular, or heart-shaped blade of steel, riveted on to the end of a steel stem, which is fixed in a wooden handle ; the use is to shave or clean the surface of the part to be solered, by taking off thin shavings, so as to present a bright metallic face, perfectly free from oxydation, without which it would be quite useless to attempt to solder.

The turnpin is a spherical cone of box or other hard wood, tapering to a blunt point ; it is of various sizes, from 1 inch to 6 inches or more in length, and from 1 inch to 4 inches or more in diameter at the larger end ; this is used for opening the ends of lead pipe, to admit of one part entering the other.

The dresser is simply a piece of hard, tough wood, planed to a smooth face on one side, a handle shaped at one end ; this is for dressing the surface of the sheet lead flat into its place, and by means of a somewhat sharp edge along one side, to beat it into angles.

The round headed mallet is used for beating the lead into circular corners or recesses, also for bossing up lead for strainers, and will be found useful for a variety of purposes, as it is not advisable to use a hammer to lead.

The chase wedge is a wedge of hard wood (usually box), with a piece left in shape of a handle on the top or thick part of the wedge, and is used for chasing the lead into sharp angles, the wedge being run along the lead, and lightly struck with a mallet at the same time.

The wiping cloth, which is one of the most important things, as without it the others are comparatively useless, is made by taking a piece of new linen bedticking, and folding it into eight or ten thicknesses, forming a pad of from 3 to 6 inches long, and 2 to 4 inches wide. This before using must be pinned together at one edge, and thoroughly saturated with tallow, by holding it in front of the fire, and rubbing the tallow in till the cloth is quite soft and supple ; this is used to wipe the solder round the joint of a pipe. The object of the tallowing process is to prevent the solder from adhering to the cloth and burning it, which it would do if this precaution were not adopted and frequently repeated.

Lead is a metal of a blueish grey color, and, when freshly scraped or polished, has a very high degree of metallic luster. It tarnishes by exposure to the air, becoming of a dull grey hue, known as lead color. It is the softest of the common metals, being easily cut with a knife or scratched with a nail, and it leaves a dark streak when rubbed on paper. It is remarkably flexible, but destitute of elasticity ; it is malleable to a very considrable extent, and may be either beaten, or rolled out into very thin sheets ; these, however, possess but little strength. Its ductility and tenacity are small ; it cannot be drawn out into wires of less than one-twelfth of an inch in diameter, and they will not support a weight of more than twenty pounds. In weight it exceeds the common metals, being upward of eleven times heavier than water. The best lead pipe is made by drawing (on the same principle as wire drawing), by small but powerful machines, in 12 and 15 feet lengths, also by hydraulic machines in 60 feet lengths. It is sometimes a great advantage to have the pipe in these long lengths, whereby a great saving of time and labor in making joints is effected ; but it has also these disadvantages, that the lead is usually harder, and not so easily got into intricate bends and windings, and is also apt to be faulty, having one side much thinner than the other. Sometimes this fault is carried to so great an extent, that there is scarcely any thickness on one side, and twice the proper amount on the other ; this, if not observed by the practiced eye of the workman at the time of fixing, is likely to lead to serious inconvenience and damage when any great pressure of water is put on, or when the pipe comes under the influence of frost. The weld or seam of the hydraulic pipe is sometimes so defective as to yield to a very slight pressure. For ordinary purposes, the pipe in long lengths is sufficiently strong, and to be depended upon ; but for high pressure work, or where pipes have to be fixed in situations difficult of access, in case of accident, the stronger and better made pipe should always be used : good useful ¾-inch pipe should weigh 28 lbs. per 15 feet length ; strong would be 35 or 36 lbs. ; 1-inch pipe at about 42 lbs. for ordinary, and 54 lbs. to 56 lbs. for strong, would be good weights ; 1½-inch pipe is usually in 12 feet lengths, which should weight from 60 to 70 lbs. and 2-inch pipe from 70 to 84 lbs.

A common solder is made by melting together about two parts of "lead" to one of "tin." Great care should be exercised not to let the "metal get too hot during the process, as if allowed to get red hot a great deterioration of quality takes place, and the solder becomes hard and brittle. It should be poured into molds of dry sand, or of sheet iron as being more convenient, if required frequently, in bars or ingots, for future use. Old joints or hards, as they are termed in the trade, are sometimes used for making up solder —previous to doing which as much of the dirt as possible should be knocked off ; the hards then melted in a pot or ladle by themselves, well stirred, and the dross or scum well skimmed off the top ; the metal may then be cleansed, by burning a little brimstone in it, and again skimmed ; after which the tin may be gradually added.

We will now suppose that two lead pipes, say 1-inch water pipe, are desired to be soldered together. As it requires a skillful and practiced workman to make a joint to an upright pipe, we will first describe the mode of making a joint while the pipe is in a horizontal position.

The two ends which are to be brought together must first of all be cut off perfectly square—next, with a mixture of size and lampblack, the pipe for a space of six inches each way is to be thoroughly painted ; this is called soiling, and the vessel that holds the mixture the "soil pot ;" the soil should be applied with a painter's sash tool. If the proper soil cannot be procured, some fresh cabbage leaves may be well bruised, and rubbed on to the pipe. The object of this soiling is to prevent the solder from adhering to the pipe beyond the limits required for making the joint. When this is quite dried, with the turnpin and hammer, the end of one pipe is to be slightly opened, and the edge of the other end very lightly rasped, so that it will enter the first about a quarter of an inch. Having thus nicely fitted the joint, separate the pipes, and with the shave-hook carefully shave about one inch or an inch and a half of each end, so that they be perfectly clean and bright. This is very important, and cannot be too carefully done—at the same time too much of the lead must not be taken away to weaken the pipe. Immediately the shaving is completed the bright part must be lightly anointed with a piece of tallow candle ; this performs the double part of a flux, and prevents the oxydation of the surface, which would be very rapid if the parts were exposed to the action of the atmosphere. The two ends must now be brought together, the outer edge tapped round lightly with a hammer, till it fits closely to the inner pipe, and the pipes securely fixed, to prevent their moving during the making of the joint. While the plumber has been performing this part of the business, his attendant, laborer, or assistant has been getting the solder and irons hot. The irons should be of a good bright red heat, and the solder look white and silvery when poured from the ladle ; if a scum of dross be formed on the top, it must be carefully skimmed off. The iron should be taken from the fire (by means of a piece of stout iron wire, with an eye at one end, and called the quench hook), and the bent handle cooled in a pail of water, so that it can be conveniently borne by the naked hand ; it must then be lightly filed all over the ball part (while still red hot), with an old file, to remove the thin scale which forms during the heating ; the cloth must be warmed, and a little fresh tallow rubbed in. Solder, irons and joint are now ready, and all that now remains is to make the joint. To do this, take a small ladle full of the melted solder in the right hand, and the cloth in the left, lying loosely in the palm of the hand, and just kept in place with the thumb and little finger. Hold this under the joint, pour the solder in a fine stream on to the joint, moving the ladle slightly, so as not to pour all in one place. While pouring the lead move the cloth and push the solder around the pipe, and if it sets very fast allow the first lot of solder to fall off, and pour on more, until a good-sized lump lie on. Then take the iron, and passing it lightly backward and forward, over and under, you will just melt the metal till it becemes of a soft buttery consistency, all the while keeping the left hand and cloth at work wiping up the solder, as it has a tendency to fall. When the pipe appears to be well tinned, and warm, and while the solder is still soft, finish off, by wiping all round with the cloth, leaving the solder about three-eighths of an inch thick in the center of the joint, and wipe off tapering at the ends. Sometimes, after wiping, joints are overcast by lightly passing the heel of the iron when barely hot enough to melt the solder over from end to end, and all round the joint, leaving a succession of ridges of metal, as it were, overlapping each other. Be careful not to touch or move the pipe for a few moments after finishing the joint, as the solder is at first very soft, even after apparently set, and will very easily break, when the only thing is to make the joint over again. If a pipe be burst or fractured by frost or some other cause, it is not always necessary to cut the pipe, and make a fresh joint ; the burst or crack may be lightly brought together with a hammer, and a patch of solder wiped on, by following the same processes of soiling, shaving, &c., as described above. If the pipe be in a perpendicular position the solder may be poured on from the ladle on to a piece of wood held in the left hand, with a slight groove down the middle. This is called a pouring stick, and by pouring the solder into the groove it is thrown on to the face of the place to be repaired, and as the pipe becomes warm it will adhere, until enough remains on to enable the iron and cloth to be used, when the solder should be worked well into the pipe with the iron, wiping up as it runs down, or it may be caught in the cloth as it falls off, just melted again with the point of the iron, and skillfully wiped on to the patch from the hand.

WHEAT AND SAVAGES.—When some European missionaries introduced into New Zealand the culture of wheat, telling the Maories that bread is made of it, they were rejoiced, for bread in the form of ship-biscuit, they had often tasted, and much relished. But when the corn was tall they dug some of it up, expecting to find edible roots ; and when they found only fibres, they thought the missionaries were making game of them. The Maories had derived their vegetable food from roots, and therefore, naturally supposed bread to be made of roots. That little hard seeds were to be ground (a process they had never seen or imagined) and the powder made into a paste with water, and then baked, was what could never have occurred to them.

AMYLACEOUS MATTER IN FRUITS.—It is asserted by Pelouze and Fremy that starch cannot be detected in green fruits, either by means of the microscope or by iodine. M. Payen shows that it can be easily recognized by iodine in the following way :—He takes a thin slice off a growing pear, apple, or quince, plunges it under water to avoid the action of the air, and to wash away soluble matters, and when the washing is complete, puts into a weak alcoholic solution of iodine. In an hour or two an intense blue coloration is produced. He also recognized starch granules by the microscope. One curious fact observed was, that as the fruit ripened the starch first disappeared from the neighborhood of the peduncle.

THE London *Engineer* says :—An experiment is being made upon malleable cast iron as a material for boilers. A small boiler 4 feet long, 7 inches diameter, ⅜ inch thick, and intended to bear a test of over 1,700 lbs., or ¾ tun per square inch, has been cast whole by a maker of malleable castings. Malleable cast iron is made from cast iron of good quality, decarbonizaed by exposure to a high heat while surrounded with oxide of iron.

ELEVEN-INCH guns are common in the American navy. No Armstrong gun has yet been made with a bore larger than 10½ inches.

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Improved Army Hat and Cap.

The English army in the East Indies have long been in the practice of wearing capes to their caps to protect their necks from the sun and dust, and when the rebellion broke out in this country, the capes, under the name of Havelocks, were introduced into our army, and at one time there was a great rage among fashionable young ladies and madams for making Havelocks for the soldiers. It is well known that they were partially a failure. Though very comfortable at times, they were found to collect the dust and consequently to become very filthy after a little use. Mr. Warburton, of Philadelphia, has recently obtained a patent for an arrangement by which the cape is folded in the top of the hat or cap when not needed, in such manner that it can be readily dropped around the neck when required.

This invention is illustrated in the accompanying engravings in connection with a ventilating arrangement for hats patented by Mr. Warburton on the 11th of December, 1860. Figs. 1 and 2 are sectional views of a military hat of the regulation pattern with this improvement, and figs. 3 and 4 are sectional views of a fatigue cap with a modification of the improvement.

In figs. 1 and 2, A represents the body and B the brim of the hat, C being the sweat band, around the edge of which is secured a light whalebone spring. About one half of the sweat band is secured to the hat in the usual manner, the rear half being disconnected, so that it can be drawn forward away from the rear of the hat.

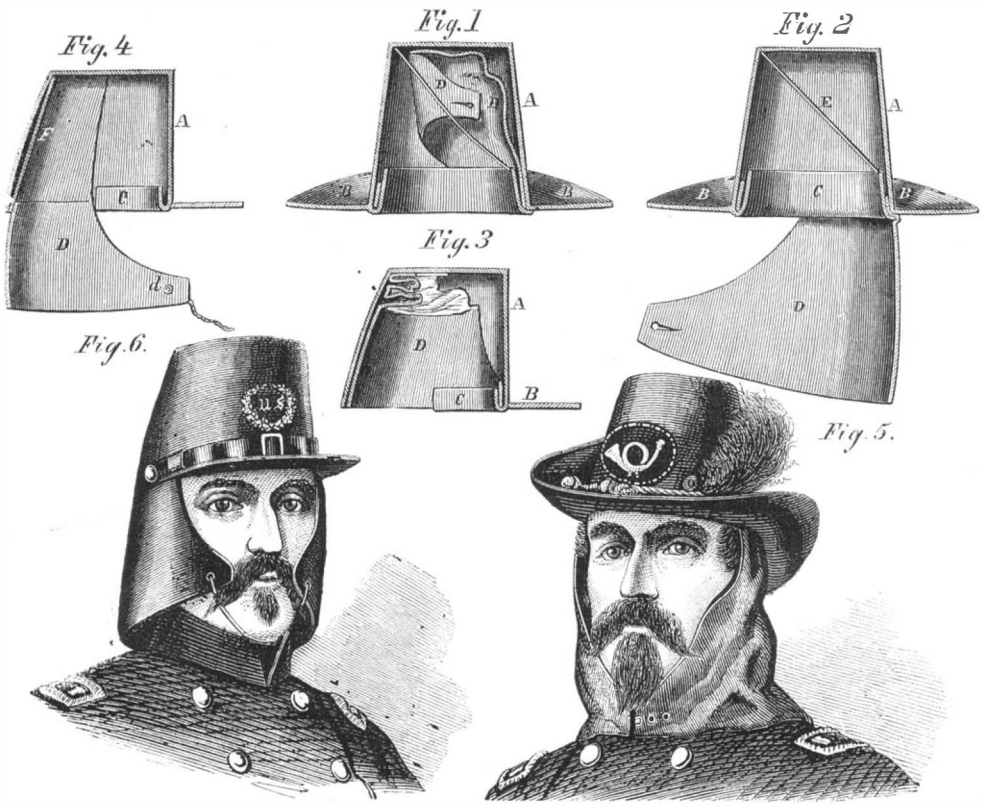
To the inside of the hat, between the body and the sweat band, is secured the cape, D, which, when not required for use, may be packed away in the interior of the body, as shown in Fig. 1; the sweat band then springs back to its proper place covering the cape from the grease and sweat of the wearer's head. When the cape or curtain has to be used, however, the rear of the sweat band, C, is drawn forward, so that the cape can fall to the position shown in Fig. 2, after which the sweat band, which is made of a material somewhat elastic, but not stretchy, is allowed to recover its former position against the interior of the hat.

The upper end of the curtain, D, is attached to about one half of the circumference of the hat, and is of sufficient extent to cover the back of the head and neck, as well as the opposite sides of the face of the wearer, its lower end being furnished with projecting ends *d d*, having any suitable appliances for connecting one end to the other, under or over the chin. The loose rear of the sweat band may be retained in its proper vertical position, by means of a band or tape, E. It will be evident, that while the cape affords the desired protection to neck and face of the wearer, its adoption involves no necessity for changing the form of the hat from the established regulation pattern, while it can be readily applied to any hat varying in outward form.

In Figs. 3 and 4, the cape is represented of a somewhat stiffer material than that referred to above, the upper end of the cape being in this instance connected to the top of the interior of the cap or hat, by a piece F, of muslin, or other suitable material. The sweat band, C, extends throughout the front portion only of the circumference of the hat or cap. When the cape is not required for use it occupies the position shown in Fig. 3 in the interior of the cap.

There are holes in the front edge of the sweat band for the admission of air to the interior of the hat, through the space between the sweat leather and the hat. This space is obtained by securing the ends of a thin metal strap across the front of the interior of the hat, it being set off from the hat about one-eighth of an inch. In addition to obtaining a space for the entrance and circulation of air in connection with the usual holes in the top, a flexible rest, or spring cushion is provided for the forehead, and grease and perspiration are by the same means kept away from reaching the hat.

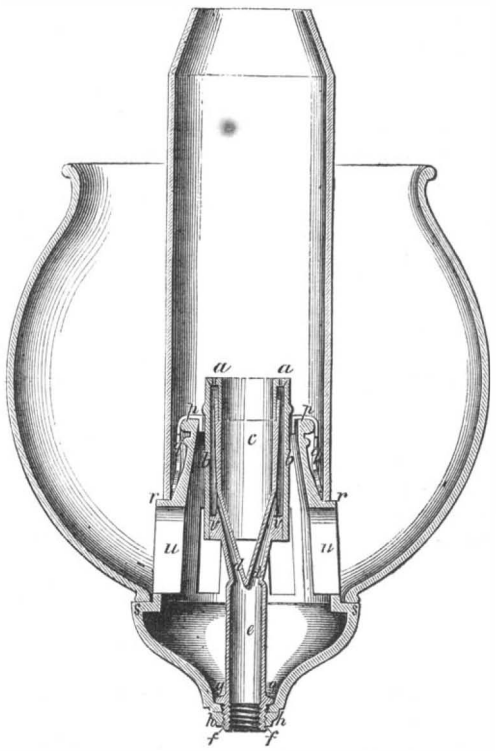
The patent for this invention was granted Feb. 25, 1862, and hat manufactures and others, who may desire to use the invention for only a special contract, or to purchase local rights, or to buy out the entire patent, can learn the terms and obtain further information from the inventor and patentee, W. F. Warburton, 430 Chestnut street, Philadelphia, Pa.



WARBURTON'S ARMY HAT AND CAP.

MONIER'S GAS BURNER.

The Argand gas burner is employed as the standard in measuring light, in the gas works of England and the United States. It forms a hollow flame which is surrounded by a chimney and supplied with two currents of air, one upon the inside and the other upon the outside. The gas is allowed to issue through a flat horizontal ring perforated with a number of small holes, from the $\frac{1}{50}$ to the $\frac{1}{32}$ of an inch in diameter according to the quality of the gas, and one current of air rises through the ring while another flows upward against the outside; the whole being surrounded by a glass chimney.



The annexed cut illustrates an improvement in the Argand burner invented by Hippolyte Monier, of Paris, France, and patented in the United States through the Scientific American Patent Agency. It consists in a substitution of an incorrodible refractory substance which is a slow conductor of heat for metal in certain parts of the burner, and in the employment of a glass basket for supporting the chimney and shade to avoid a shadow below the lamp.

The grate, *a*, is a short tube of which the exterior is in the form of an inverted frustrum of a cone, with a flange at its upper extremity perforated with holes from which the gas issues; this flange being beveled as shown. In Monier's improvement this tube is made of burnt plaster, clay, or other incorrodible, refractory material which is a slow conductor of heat; *b* is a porcelain tube forming the exterior of the burner, having its upper end beveled to fit the flange of the grate, *a*; *c* is a tube of metal into which the tube of the grate, *a*, fits and which combines with the latter tube to fit the tube of the burner. The tube, *c*, has a deep flange, *v*, at the bottom to fit the interior of the tube, *b*, and it is made in the same piece with the hollow fork, *d d*, and hollow stem of the burner. The piece *c d e f g*, being protected from the heat by the slow conducting nature of the substance composing the other two pieces, *a b*, may be made of lead or other fusible metal when cheapness is an object. The three pieces of which the burner is composed are united by a suitable cement, and the burner thus constructed presents essentially the same form as the ordinary Argand gas burner. The metal portion may be painted white to harmonize in appearance with the tube, *b*.

The stem of the burner, besides the internal screw thread which screws on to the gas pipe, has an external screw thread, *f*, and a collar, *g*, above the thread. This is for the attachment of the glass basket that supports the chimney and shade; a nut, *h*, being screwed on below the basket. A washer of soft leather should be interposed between the collar and basket to prevent the glass from breaking. The basket has a horizontal ledge around its outer side for the support of the shade, and projections above the ledge to support the chimney. Between these projections are openings through the basket for the admission of air; the air entering the shade at the top and passing down by the side of the chimney, and thus being warmed in its passage. The chimney is steadied by the elastic arms, *g*, of the metal ring, *p*.

There are modifications of the basket proposed by the inventor, embracing, however, the same principle. For instance, the shade and chimney may both rest upon the same ledge, and the air may be admitted through holes below the ledge, and under the edge of the chimney between the projections upon which it rests.

We have seen flattering mention of this burner in the French journals, with statements of the great saving of gas effected by its use. It has also been used to some extent in this country. The advantage of having no shadow directly beneath the light is obvious.

Persons wishing to treat with Mr. Monier, in respect to the introduction of this invention into the United States, can address him to the care of M. Desnos Gardissal, No. 29 Boulevards St. Martin, Paris.

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Scientific American

MUNN & COMPANY, Editors and Proprietors.

PUBLISHED WEEKLY

At No. 37 Park-row (Park Building), New York

O. D. MUNN, S. H. WALES, A. E. BEACH.

TERMS—Two Dollars per annum—One Dollar in advance, and the remainder in six months.

Single copies of the paper are on sale at the office of publication, and at all periodical stores in the United States and Canada.

Sampson Low, Son & Co., the American Booksellers, No. 47 Ludgate Hill, London, England, are the British Agents to receive subscriptions or the SCIENTIFIC AMERICAN.

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VOL. VI. NO. 13.....[NEW SERIES.].....*Eighteenth Year.*

NEW YORK, SATURDAY, MARCH 29, 1862.

WHAT CAN BE DONE FOR INVENTORS.—ADVICE GRATIS AND ADVICE FOR PAY.

For the information of our new subscribers, we would state that it is the custom, at the office of this paper, to examine models or drawings and descriptions of alleged new inventions, and to give written or verbal advice as to their patentability, without charge. Persons having made what they consider improvements in any branch of machinery, and contemplate securing the same by Letters Patent, are advised to send a sketch or model of it to this office. An examination will be made and an answer returned by early mail. Through our Branch Office, located directly opposite the Patent Office in Washington, we are enabled to make special examinations into the novelty and patentability of inventions. By having the records of the Patent Office to search, and the models and drawings deposited therein to examine, we are enabled to give an inventor most reliable advice as to the probabilities of his obtaining a patent, and also as to the extent of the claim that it is expedient to set up when the papers for an application are prepared. For this special examination at the Patent Office we make a charge of Five Dollars. It is necessary that a model or drawing and a description of the invention should accompany the remittance.

The publishers of this paper have been engaged in procuring patents for the past sixteen years, during which time they have acted as Attorneys for more than FIFTEEN THOUSAND patentees. Nearly all the patents taken by American citizens in FOREIGN countries are procured through the agency of this office.

Pamphlets of instructions as to the best mode of obtaining patents in this and all foreign countries are furnished free on application.

For further particulars as to what can be done for inventors at this office, see advertisement on another page, or address MUNN & Co.,

No. 37 Park-row, New York.

OUR NAVY—WHO IS TO BLAME?

"What is the use in complaining now of the imbecility of the Navy Department?" is the enquiry which escapes the lips of many loyal citizens. It is now too late to save the old frigates *Cumberland* and *Congress* and their brave defenders—then why complain?

We admit that whatever disasters have now befallen us, cannot be remedied; but unless the people stir up the government to new life and energy in conducting naval affairs, little can be expected. The Commodore wants his big decked ship to strut over in maneuvering, and the naval engineers have their heads crammed full of conceited notions of their own wisdom. The Secretary must constantly hear these officers ventilate in his presence their *bilious* notions and it is not strange therefore that he should think that all knowledge on such subjects is necessarily lodged with them. In their estimation, every man who presumes to suggest a change in the construction of naval vessels is a wild enthusiast and every patient inventor is in their sublimated wisdom a member of a crazy class who think only in the third heavens, and get only one degree downward in their practical results. John Ericsson, with his "Yankee cheese box," was, at the Brooklyn Navy Yard, considered about 'luny" when he brought his nondescript craft along side their old wooden-walled frigates, which could not have stood a fight with him fifteen minutes.

Since writing the foregoing we have read an article on our navy from the *Commercial Bulletin* which closes with these remarks:—"The mechanics upon whom the Secretary of the Navy has relied for advice, have uniformly condemned the construction of iron-clad vessels upon scientific grounds, yet the Secretary must bear the odium of their ignorance. The vessels now in the course of construction, were forced upon the Department by Congress in opposition to the desires of the leading naval architects."

This confirms all that we have uttered on this subject. Who are these "mechanics" and "leading naval architects," who have been guilty of such ignorance? Are any of them holding office under government—which we suspect? If so let them be discharged at once—they have done mischief enough, and ought to be turned adrift. Secretary Wells knows them, and if he continues them longer in the public service to curse the nation by their ignorance and conceit, the whole blame will properly fall on his shoulders.

THE UNITED STATES AND CANADIAN RECIPROCITY—PATENT LAWS.

The Committee on Commerce of the House of Representatives has made an important report on the resolutions passed by the New York Legislature in relation to the treaty, made in 1854, between the United States and Great Britain, commonly known as the Reciprocity Treaty. This report deservedly presents the conduct of Canada in a most unfavorable light. This treaty was formed with the government of Great Britain for the mutual benefit of Canada and the United States, and it went into effect in 1855. Its objects were reciprocal trade between the two countries, and the United States has sacredly maintained its engagements. Canada, however, has not been faithful to the understood objects of that treaty, for since it was formed she has greatly increased her tariff upon most American manufactures. The duties now levied in Canada upon boots and shoes, saddlery, wearing apparel, &c., are a hundred per cent heavier than when the treaty was signed, and on nearly all other American manufactures, such as woolen and cotton goods, hats, household furniture, glass, agricultural implements, tools, firearms, carriages, hardware, india rubber articles, &c., it has been increased to 62½ per cent. In 1860 no less than $20,365,829 worth of Canadian products were admitted, duty free, into the United States, while only $7,069,689 worth of American products were admitted duty free into Canada. The Reciprocity Treaty is now a misnomer. Its benefits are nearly all on one side, and no wonder petitions have been pouring in upon Congress for its repeal. No complaints, perhaps, would ever have been made had the benefits of the treaty been even greater than they are in favor of Canada, if she had maintained a sacred compliance with the understood obligations involved in the treaty, but instead of doing this she has raised her tariff almost to a prohibitory standard, and thus she precludes American manufacturers from enjoying benefits in Canada similar to those which the producers of that province enjoy in the United States.

The report states that the one-sided tariff laws of Canada have been enacted against the will of a large majority of the Upper Province, by the influence of Canada East, for the purpose of diverting the trade of the upper lakes through the St. Lawrence instead of the waters of New York. It is justly irritating to American citizens on the border to witness the chief products of Canada admitted duty free under the name of *reciprocity* into all the ports of the United States, while American manufactures are almost forbidden to enter into Canada.

We have another subject of complaint against Canadian injustice in her patent laws. The subjects of Great Britain can obtain patents in the United States upon the same terms and conditions required of American citizens, but Canada specifically prohibits the granting of patents to any others than resident subjects who must be the inventors of the articles for which patents are sought. This effectually cuts off American citizens from securing their just rights in Canada.

This policy appears to be based upon the dishonorable idea that Canadian speculators, manufacturers and others may benefit the province by prowling through the United States Patent Office, our machine shops and manufactories, and carry off all the improvements they can find, without paying inventors for their use. And the mean selfishness of this policy is not confined in its action to citizens of the United States, but to Englishmen and Scotchmen residing in the mother country. The Canadian patent law prohibits the granting of patents to inventors who have patented their improvements in Great Britain and America. There is certainly a far higher sense of honor and reciprocal friendship existing between the people of the United States and Great Britain respecting justice to and encouragement of their inventors, than exists between those of Canada and England, although the former is a province of Great Britain. We know there are a number of noble minds in Canada, who lament such selfishness in her legislation, and they have strenuously endeavored to obtain a reform of the patent system in that province, but hitherto they have not been able to control the policy which has prevailed. True reciprocity between the two countries would be alike beneficial to both, but that kind of reciprocity which has prevailed in Canada for the past four years, cannot be practiced upon the United States much longer; and for any retaliatory policy which may be inaugurated, Canada will have herself to blame.

JEALOUSY BETWEEN THE ARMY AND NAVY.

In the remarks of Capt. Ericsson before the New York Chamber of Commerce, in relation to the fight of the *Merrimac* with the *Monitor*, which are published on another page, will be found the statement that the *Monitor* had 50 wrought-iron shot on board, but these were not used because Commander Dahlgren had issued strict orders that the guns should not be loaded with them. Capt. Ericsson expresses the opinion that with these projectiles it would have been easy to sink the *Merrimac*, and probably most engineers will concur in this opinion. There could have been but one ground for prohibiting the use of these shot, and that was the danger of bursting the guns. The guns were cast after the plans of Commander Dahlgren, of the Ordnance Department of the Navy; they were cast solid and then bored. Now, Capt. Rodman, of the Ordnance Department of the Army, has demonstrated, by a series of costly experiments conducted at the national expense, that heavy cannon are far stronger if cast hollow and cooled from the inside by a stream of water passing through the core. Why are not the large guns in the navy cast in this way?

We have heard it frequently asserted that there is a jealousy between the ordnance departments of the army and navy which prevents improvements originating in one service from being adopted in the other, but we have never believed the statements. That the able and accomplished gentlemen who are at the heads of these departments should be influenced by such a boyish spirit is incredible. It is the boast of our people that we are above that prejudice, so common in the world, which prevents one nation from adopting the improvements of another, and we believe this boast has been more common in the army and navy than anywhere else. It cannot be that our officers have sufficient magnanimity or common sense to be ready to introduce any good feature from foreign armies, and yet are guilty of the exceeding littleness of being jealous of each other.

We have no doubt, therefore, that the Ordnance officers, both of the army and navy, are always ready to adopt anything which is a real improvement, from whatever source it may come, and that the reasons why the large cannon for the navy are cast solid are to be sought in the properties of matter and the circumstances of the case; and not in any small jealousies in the hearts of the officers. We have been studying all the reports to learn whether the prohibition extended to the use of solid cast-iron balls as well as wrought.

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STEAM RAMS AND THEIR QUALITIES.

During the Crimean war, J. Nasmyth, the inventor of the steam hammer, proposed to build an iron marine steam ram for the British government, and had his proposal been accepted he would have produced a truly infernal battery. This vessel was to consist of a powerful iron steamer, having a strong iron bow, with a huge gun in it. It was designed to be capable of moving under water, for the purpose of dashing its prow into the side of an enemy's ship, and then discharging a great shell into it under her waterline, thus opening a huge rent for the sea to enter and sink her. Several months since Charles Ellett, C. E., directed the attention of our naval authorities to the formidable character of steam rams, and on page 121, present volume of the SCIENTIFIC AMERICAN, we described the qualities of such vessels, and said :—"We believe that all iron war steamers should be built with strong iron bows, to employ them, when proper opportunities may occur, for running down other vessels." In that article we described the conditions of efficiency which should be embraced in all such vessels, and our views have been copied by a number of our cotemporaries. The terrific and successful attack of the *Merrimac* upon the *Cumberland*, by crushing in the sides of the latter with her iron prow, has excited much public attention, and a number of scientific men and others have expressed their opinions upon the subject through the daily papers; but many of their views do not appear to be sound. They may be briefly presented as follows :—

A common river steamboat may be converted into a powerful steam ram by strengthening her bow. Such a steam ram would crush through the *Merrimac* or any other iron-clad steamer, by striking her when moving at full speed. A cotemporary presents the science of the question as follows :—"A tallow candle from a musket, by its velocity, will go through a pine board, and upon the North river an accident occurred in a river steamboat of great speed, striking against the wharf, penetrating twenty-seven feet through timbers, stone, earth, &c."

Mr. A. W. Craven, C. E., of this city takes nearly the same views of the question in two communications to the New York *Times*, and cites the following cases as proof :—

"The river steamer *Isaac Newton*, while under but little headway, was attempting to make her berth at the wharf in Albany. The engineer, mistaking a signal, ran her forward instead of backward. She struck the wharf with comparatively but slight velocity, but her bow cut through the timber bulkhead, and penetrated fully six feet into the rock and earth filling behind it.

"When the *Adriatic* was launched she crossed the East river, and struck the pier on the opposite side, cutting through the timber, and into the wharf, between six and seven feet.

"In neither of these cases was there any material injury sustained by the vessels.

"In East Boston, about two years since, a merchant vessel of about 1,400 tuns burden was launched, and owing to the failure of the appliances for checking her way, she crossed to the other side of the channel. With only the speed she acquired from the launching ways, her stern penetrated into the wharf some eleven feet. This wharf had a front of one hundred feet—it was built of masonry on its face and side, and was backed up with rock and ballast running off at an angle of 45°, and with earth closely compacted by years of wear. The vessel was not perceptibly injured."

Neither the shooting of a tallow candle through a pine board (a feat which we have failed to perform, after repeated trials), nor the crushing of a river steamer several feet into a dock, are proofs of much value respecting the employment of river boats as steam rams. We are well aware of the penetrating power of bodies moving at high velocities, but we have never seen a target made of boiler plate penetrated by a leaden bullet, and eight-inch cast-iron shot have been shattered to pieces when fired against iron plates four and a half inches in thickness. The efficiency of a steam ram will be just in proportion to its mass, the strength of its frame and the power of its engines. The Naval Committee of the Senate has taken a proper view of this question at last. Senator Hale, from the Committee of Naval Affairs, has introduced a bill which provides for the construction, under the direction of the Secretary of the Navy, of an iron-clad steam vessel, of not less than five or six thousand tuns burden, and of great speed and strength to be used only as a ram, for which purpose $1,000,000 be appropriated. Also, $13,000,000 for the construction of iron-clad gun boats, $783,000 for the completion of Stevens's battery and $500,000 for extending the facilities of the Washington navy yard, so as to roll and forge plates for the armored ships.

A steam ram to be really efficient must be built for the very purpose. An iron-clad frigate like the *Warrior*, with engines of 2,500 nominal horse power, could crush through a dozen river steamboats fitted up as steam rams. To meet other steam rams upon superior terms we must build superior vessels. Our opinions are fully confirmed by the result of the encounter between the *Merrimac* and the *Monitor*. The former ran against the latter at a considerable speed and struck with her bow, which was fitted with an iron horn, but she fared worst in the conflict, although she is three times larger and has engines of twice the power. Had the *Monitor* been a patched-up river steamboat she would have gone to the bottom in five seconds. Her greater strength of hull enabled her to resist the blow of her huge adversary. Let us have no mantraps converted into steam rams.—We have no objections to urge against the employment of strong river steamers for war purposes in cases of emergency. Some of them may be plated with two-inch plates, and do good service against foes and forts, but we wish to guard the public against an overestimate of their efficiency.

ARTILLERY MATCHES AND SIGNALS.

The portfire used for firing artillery is made of three parts of niter, two of sulphur and one of gunpowder well mixed and rammed in cases. An inextinguishable match is made of four parts of saltpeter, two parts gunpowder, two parts charcoal, one part sulphur, all mixed dry. The mixture is then put into paper cases nine inches long and about the thickness of a common quill. These cases are prepared by rolling thick hard paper pasted on one side, round a glass rod. When this composition is ignited neither wind nor rain will extinguish it. The only way to stop its progress, when found leading to a mine, is to cut off the burning end.

Signal lights are in general composed of sulphur and niter with a small quantity of some sulphuret, such as that of arsenic or antimony. Mix 600 grains of niter, 200 of sulphur and 100 of the yellow sulphuret of arsenic, and place them in a paper case, and when ignited a brilliant white light will be emitted. If the sulphuret of antimony is used in place of the arsenic, it will give a vivid light of a blueish tinge.

"Indian white fire for signals" is made of dry saltpeter twenty-four parts, sulphur seven parts, charcoal one part and the sulphuret of arsenic two parts. These substances are intimately mixed and dried slowly in an iron vessel, then rammed into paper cases three inches long and one inch and a half in diameter. These cases are inclosed and kept in a dry place for use. A piece of red-hot charcoal, or a red-hot iron may be used to ignite these signal lights.

THE NAVY DEPARTMENT AND IRON-CLAD WAR STEAMERS.

The proposals issued by the Navy Department for the construction of new iron-clad war vessels, which we published on page 166 of our present volume, deserve the candid criticism of all who are interested in naval engineering. It appears to us the Navy Department has advertised for impossibilities. Thus, let us take the class of steamers advertised for coast defence. The proposals say that such vessels must "have sides and decks protected with iron armature sufficient to resist the heaviest shot and shells;" and "are not to draw more than twenty feet of water when fully equipped and armed, at which draft they are to be able to maintain a *permanent* speed of *fifteen knots* per hour at sea, and carry sufficient coal in the bunkers for twelve days steaming at that speed. Their armament will consist of one or two 15-inch or 20-inch guns."

It is our opinion that there is not a respectable engineering firm in our country, or the whole world, that will undertake to build vessels to fulfill such conditions. The speed required is one knot per hour at sea greater than that of the *Warrior* in smooth water. It is higher than that of the *Vanderbilt*, *Adriatic* or the *Persia*—the swiftest merchant vessels in the world, and they were built as light as possible, and with very limited breadth in proportion to their length, for the purpose of attaining high speed. The speed required for this class of iron-clad government steamers is equal to that of a steamer which could cross the Atlantic from New York to Liverpool in a little over seven days, or about two days less than the best passages made by our fastest Atlantic steamers. And all this is required to be accomplished by a vessel loaded with thick iron armor, and she is to draw but twenty feet of water. We question if a steamer can be built to resist the largest shot, such as that of a 15-inch or 20-inch gun. The engineering world, at least, has no experience of the kind, and these naval proposals, therefore, make demands of an unwarrantable nature. Such proposals appear as if they were intended to prevent respectable engineering firms from offering to make contracts with the government. If they do not they certainly require some explanations from those who have put them forth.

NEW STEAM FLOATING BATTERY.

We understand that Messrs. Stevens, of Hoboken, will soon place in the possession of our government a small iron clad gunboat, which had originally been a canal boat, and which has been fitted up at Bordentown, N. J., with a screw propeller, water tight partitions, and all the contrivances for sinking her to a fighting depth which have been introduced in Messrs. Stevens' great battery. She is, in fact, designed to illustrate, on a small scale, the principal novelties and merits of that mammoth concern; and they are now prepared to turn her over to the government, free of expense, for active service. Her name is the *Naugatuck* Her dimensions are those of an ordinary canal boat. Her speed, when submerged to the depth of 7½ feet, about seven knots per hour. She can carry coal for twelve days, and a crew large enough to work the vessels and handle her armament. The latter consists of a single one hundred pounder of the Parrott pattern, which experiments have proved to be perhaps the most formidable rifled gun in the world. When the *Naugatuck* is sunk to her fighting depth by the admission of water to the chambers in her bow and stern, her entire machinery, steering apparatus and vulnerable parts will be below the water line; and nothing will be exposed to the enemy's shots but a narrow strip constituting the gunwale, and the gun.

EXCITEMENT ON HOSE COUPLINGS.

Under the claim of patent No. 34,476, in our issue of March 15th, page 172, reference is made to the invention as having been adopted in Brooklyn, and recommended by the Chief Engineer of the Fire Department for adoption in New York. The owner of another patent hose coupling denies that Bliss's has been adopted, and to substantiate his statement produces a report from Chief Engineer Decker to our Common Council, which reads as follows :—

Among the various improvements of late introduced, and which I consider proper to refer to your honorable body as being beneficial, and having a tendency in a short time to lessen the expenses of the Department, I recommend your favorable consideration to the adoption of the efficient, durable and simply-constructed hose and hydrant coupling now in use in the City of Brooklyn, and patented by Mr. Emerson Gaylord.

As near as we can ascertain of the facts in the case both Mr. Bliss and the owners of the Gaylord patent construct their couplings in nearly the same manner, each claiming that the other infringes his patent The court has been, or will be, called upon to settle the controversy, we are informed.

Chief-Engineer Stimers.

We publish on another page a letter written by Chief-Engineer Alban C. Stimers, of the U. S. Navy, who had charge of the construction of the *Monitor* after Capt. Ericsson's designs. Mr. Stimers was on board of her at the time of her engagement with the *Merrimac* and conducted himself gallantly. He is an accomplished engineer, which means that he understands his business, and is not wedded to old naval tread-mill notions.

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CAN GUNCOTTON BE USED FOR ARMY PURPOSES?

Judging from remarks in some Southern papers, gunpowder is becoming scarce in the secession region, and the employment of guncotton is recommended as a substitute. The New Orleans *Delta* directs the attention of chemists to this subject, but in doing so exhibits a great want of correct information on the subject. It states that guncotton is made by steeping common cotton in "monohydrate of azotic acid for fifteen minutes, after which operation it is washed and dried and becomes one of the most powerfully explosive substances known." The chief reason alledged why it has not heretofore been used in warfare is its great cost, but it says "this objection is not applicable in the South, as the principal ingredient, cotton, may be had for the asking." It also states that while it is better than gunpowder for charging bomb shells and blasting in mines, it is unfit for small firearms on account of its vastly greater explosive power, which causes them to burst.

It is not because guncotton possesses greater explosive force, weight for weight, than gunpowder that it has not been used for rifles, as all that would be required to make them equal is to use smaller charges of the former. A charge of guncotton equal in weight to a common charge of gunpowder has burst a steel rifle barrel as if it had been glass. This was owing principally to its very rapid ignition, not its greater explosive force. Although steel has been held to be the strongest and best metal for rifle barrels, it is perhaps more liable to burst than the excellent wrought iron used in the barrels of the rifle made at the Springfield Armory. Good fibrous iron is not so easily broken with a sudden blow as hard steel. An officer in the army has informed us that he has frequently used guncotton mixed with an equal weight of raw cotton in a rifle-musket, and he is confident it may thus be employed with safety, but owing to the high price of cotton it would be far too expensive at present in the North for army purposes; and it is a far more hopeless subject for the Confederates. They have got the cotton but this article is useless without chemical agents.

To make this peculiar explosive substance, clean raw cotton is immersed in equal parts of concentrated nitric and sulphuric acids. After being immersed for a few minutes, until it has assumed a peculiar opaque appearance and has lost its elasticity, it is taken out and washed with soft water until all traces of acid are removed, when it is dried. These operations must be conducted with great care. Although cotton may be obtained for nothing at the South, neither sulphuric nor nitric acids are to be had there, consequently, guncotton is out of the question for secession bombs and bullets. The explosive force of guncotton, as compared with gunpowder, is as 4 to 1, weight for weight, as has been determined by Major Mordecai, U. S. A., in a series of experiments. Although sulphuric acid is used in its manufacture, no sulphur has been found in its composition. It is the nitrate of lignin, and its chemical constituents are :—

Carbon	20.000
Oxygen	62.220
Hydrogen	2.220
Nitrogen	15.560
	100.000

It is certainly more cleanly and more compact than gunpowder, and for shells it is superior, but more water is formed during its ignition; hence it is said to be more corrosive in its action upon the metal, which is a great and perhaps fatal objection to its general employment for firearms.

ARMSTRONG GUNS ON THE "MERRIMAC."

The correspondent of the New York *Times* at Fortress Monroe, in his letter dated March 12th, in describing the *Monitor* after its late conflict, says :—"All over her are slight indentations or depressions where the Armstrong balls struck and fell harmless on the deck." We have also read statements of other correspondents to the effect that the *Merrimac* was equipped with several Armstrong guns.

Those who write upon such subjects should not give mere heresay information. There are no such missiles as Armstrong balls anywhere, and there is not a single Armstrong gun out of the British navy and army. All the Armstrong guns are manufactured under contract for the British government, but according to the statements contained in the columns of our worthy cotemporaries, the London *Engineer* and *Mechanics' Magazine*, Sir William Armstrong's guns are really about the worst ever made. They are not to be compared to American guns for strength, efficiency and simplicity. Capt. E. P. Halsted, R. N., condemns them. Their vent pieces blow out; they very soon become clogged and unfit for firing; they are liable to leak at the breech, and are inferior in range and precision of fire to the Whitworth gun.

CALIFORNIA STATISTICS AND PROGRESS.

The value of California products exported fron San Francisco in 1861 was: products of the mines $42,103,193; of agriculture, $3,265,471; of cattle, $1,041,217; timber, $69,931; fisheries, $21,828; manufactures, $962,876; wine $8,000; total, $47,472,516. The gold coinage in the San Francisco mint was $16,126,000; of silver, $475,000. Wheat, barley, oats, wool and hides are the principal products of farm export from California. This barley is the best that comes to New York, and the hides are not surpassed by any others.

River mining is now almost entirely abandoned to the Chinese, who are contented with small gains. The days of making a fortune by washing the earth with a tin pan are gone forever, it is believed. Hydraulic mining—washing the earth with a great pressure of water directed upon it through hose—is still conducted upon an extensive scale, and continues profitable. Gunpowder is now employed to blast banks of hard gravel and loosen the earth prior to applying the hose pipe for washing. No less than 70 kegs of powder was used last year by one company, in Placer county, in a single bank 60 feet in hight.

The late silver discoveries in California are of the most surprising and gratifying character. The San Francisco *Bulletin* states that in Nevada county, a few miles from Grass Valley, there are two leads which have been worked for a number of years past for the gold only, which have been found to contain large quantities of silver—late assays showing that the ore contains from 300 to 800 ounces to the tun. Searches made for the purpose of discovering silver ore have resulted in obtaining such ores in a great number of places where it was not suspected to exist. Some of the silver veins are equal to the richest in Mexico.

Rich copper leads were discovered in the early part of last year in Salt-Spring Valley, near Stockton, and a new city, named Copperopolis, has been laid out, and it seems to be in a fair way of rising into importance. Several hundred miners are employed by four or five companies. The ore contains from 33 to 56 per cent of copper, and yields 2½ ounces of gold and 11½ ounces of silver to the tun. Several thousand tuns of the ore have been sent to Boston, Mass., and to Swansea, England, for smelting. A rich specimen of this ore, weighing 2,500 lbs., has been sent to the World's Fair in London. A considerable quantity of nickel has also been obtained in some of the ores.

Large deposits of the oxide of the manganese have been found in Nevada county; petroleum springs in Santa Clara, Humboldt and Mendocine counties; diamonds in Butts county and coal in Almeda county. The quantity of coal mined is still small, being about 30 tuns per day. Three thousand tuns have been forwarded to San Francisco, where it sells at $15 per tun. Other coal veins are said to have been discovered in Nevada county, but, so far as we have been able to learn, the veins are very thin. A plentiful supply of coal seems to be California's great want. It never can become a permanently great mining and manufacturing country without cheap coal. This important article may yet be discovered in great abundance.

HARBOR DEFENCES.

Some of the leading merchants of this city appear to be trembling for fear of a visit from the *Merrimac*. A special meeting of the Chamber of Commerce was held on the afternoon of the 18th inst., for the purpose of discussing this question and devising measures for the defence of the harbor. The Mayor of the city, Peter Cooper, Capts. Ericsson and E. E. Morgan expressed their opinions, and delegations from the Philadelphia and Boston Boards of Trade were also present. The general opinion that prevailed respecting land forts was that they were useless against iron-clad vessels. A resolution was therefore passed declaring it "the duty of the cities of New York, Boston and Philadelphia to enter at once upon the creation of iron-clad vessels of the requisite strength and power to cope with the *Merrimac* or other formidable floating batteries." Capt. Ericsson advised the construction of several light iron-clad vessels to carry large 15-inch guns, but Capt. Morgan advised the conversion of old harbor tugboats into steam rams, for striking such a vessel as the *Merrimac* under the waterline and sending her to the bottom in hot haste. Capt. Ericsson's suggestions were founded upon providing a class of small-iron clad vessels to resist such a vessel as the *Warrior*; those of Capt. Morgan to attack the *Merrimac*. They seem to have been made under the idea that if a large iron-clad frigate visited New York harbor with warlike intent it would stand still and allow small steam rams to dash into its sides; and light gunboats to stand off at a distance and fire away, without receiving a shot, or a blow in return. Our harbor defences should undergo a complete revolution, but we trust no money will be needlessly expended upon new floating batteries of doubtful character.

OUR NAVY A YEAR AGO.

In the month of April, 1861, we spent a few days in the City of Washington, and while there we passed one profitable hour with Capt. John A. Dahlgren, Commander of the Washington Navy Yard. In view of the possible dangers that then threatened our country, we found that accomplished ordnance officer fully awake to the importance of iron-clad ships. He had presented this subject to the attention of the naval authorities, as early as Dec. 1860, in proof of which we invite our readers to turn to page 274, Vol. IV. of the SCIENTIFIC AMERICAN. That paper is worth reading. It is a document that possesses at this time historic value. On our return from Washington we published an article entitled "The Real Strength of our Navy," which closed with these words "no time is to be lost in commencing a *ship in proof*. Such a vessel would have steamed into Charleston harbor any day, and kept up a permanent communication with Fort Sumter, regardless of the fire of the batteries, if they had rained shot and shell on her and that without carrying a single gun, or needing a shot from Sumter to cover her." Such was the language we used on April 27, 1861, and we ask the public to say whether our suggestion was not worth heeding.

Who is the Man?

The whole world is intensely interested in the question of iron-clad war vessels. Thus far Capt. John Ericsson has placed his name above all others in this country for originality of design and rapidity of execution. The country will ever owe him a debt of gratitude for his ingenuity and perseverance. He who discovers the best form of vessel for war purposes in all points of economy and effectiveness will be sure of pecuniary reward and historic fame. Who is the man?

STEVENS BATTERY FOR FRANCE.—It is reported that M. Mercier, the French Minister, recently visited the Secretary of State to know if there would be any impropriety in obtaining and forwarding to his government copies of the plans, specifications and drawings of the celebrated Stevens battery. The privilege was freely accorded him, and M. Mercier and Senator Hale, Chairman of the Senate Naval Committee, called upon Mr. Stevens for the documents to enable the French government to add to its already formidable iron-clad steam war marine.

Picture of the "Monitor."

The SCIENTIFIC AMERICAN of last week contains the only correct illustration of the *Monitor* which has yet appeared. Every other plan we have yet seen, must have been hatched up in the brain of the artist without his ever having seen the battery. We will furnish electrotypes of it on receipt of $5.

WATER GAS—LIGHT WANTED.—What has become of Sanders's water gas? We predicted its failure, yet we were assured by most respectable gentlemen in Philadelphia, who were interested, that it was a success, and that our prognostications would be upset. We repeat the inquiry—What has become of Sanders's water gas?

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SUBJECTS FOR INVENTIONS.

In a former number of the SCIENTIFIC AMERICAN we published a list of subjects suited for study by ingenious people, with a view to the development of further discovery or improvement. The publication of that catalogue has resulted in the bringing forward of several new and probably important inventions. For the benefit of our readers we again repeat the list, with alterations and additions. We shall at all times be pleased to receive from correspondents any further contributions to this column of suggestions.

A PRACTICAL MODE OF SAVING THE WASTE MANURE OF CITIES.—There is manure and ammonia enough wasted in the City of New York to enrich half a dozen counties.

A NEW CEMENT FOR COATING CASKS CONTAINING PETROLEUM.—Various cements have been tried, but all have failed to prevent the petroleum from leaking.

CLOTHES LINE.—A process, composition or device to protect clothes lines against the influence of the weather, particularly to prevent them from shrinking when getting wet.

GAS APPARATUS.—A portable self-acting gas apparatus, so arranged that the same can be started simply by turning a faucet whenever desired, and that it shuts itself off as soon as the gas holder is full.

SURGICAL INSTRUMENTS.—A simple instrument for extracting balls from wounds. With the implements now in use in most cases it is necessary to cut the wound larger or to cut a fresh opening in order to get hold of the ball.

A SIMPLE AND COMPACT DEVICE FOR STRETCHING AND SUPPORTING FRACTURED LIMBS.—The several devices now used in the army and navy for dressing limbs which have been fractured by balls are so numerous hat a complete set fills a good-sized box, which consequently becomes very expensive to make and cumbersome to transport.

A PROJECTILE FOR IRON-CLAD VESSELS.—A projectile is wanted capable of penetrating or adhering to the sides of iron-clad vessels, in such a manner that by explosion or otherwise a breech may be made.

COVERING VESSELS WITH PROTECTING ARMOR.—A cheap and quick method of covering vessels with protecting armor.

GRAPPLE FOR SEIZING HOLD OF AND BORING THROUGH IRON-CLAD VESSELS.—A grapple or other device for seizing and holding fast to marine monsters like the *Merrimac*, and of boring through her sides when you get hold.

ORDNANCE AND PROJECTILES FOR STRIKING IRON ARMOR-PLATED VESSELS BELOW THE ARMOR PLATING.—Improvements in ordnance and projectiles for striking those parts of iron armor-plated vessels which are so far below the water line as to require no armor to protect them from the ordnance and projectiles at present in use; or some substitute for cannon as a means of arming vessels for the purpose of striking armor-plated ships below the plates.

SUBMARINE MACHINES.—A very important field for ingenuity is the discovery of an efficient method of preventing the entrance of vessels into harbors by submarine shells or explosives.

AN EXPLODER.—An adjustable attachment to the bow of a battery, by which a powder magazine could be carried under an enemy's vessel and exploded at the moment and place desired.

A SMALL LOCOMOTIVE FOR FAMILY USE—Suited to run on common level roads, to be light, safe, neat, convenient, easily managed by any person and not expensive to run. Great speed not essential.

AN INSTRUMENT TO INDICATE THE COMPARATIVE PURITY OF THE ATMOSPHERE.—We already possess the thermometer which shows the temperature; and the hygrometer which tells us the comparative dryness or moisture of the air. We now need a simple instrument that will indicate to the eye whether the air in our rooms is pure or impure.

A POROUS SUBSTITUTE FOR LEATHER.—Many excellent substitutes have been invented, but most of them involve the use of gum, paint or some water-proof substance, so that the article produced is unfit for the feet, and for other purposes to which leather is applicable.

A PULSE INDICATOR—A small instrument for the sick room, capable of application to the wrist of the patient, to show and record the number of pulse beats.

A CHEAP METHOD OF PREPARING THE METAL MAGNESIUM.—This metal possesses the remarkable property of burning with a most brilliant light when held in the flame of any common lamp or candle. The light thus produced far excels that of gas or coal oil; but the great expense of producing the metal is the obstacle which stands in the way of its employment. It is believed by many persons that if some cheap method of producing the metal can be invented, the magnesium light will come into general use. Here is a fine problem for amateur chemists.

SUBSTITUTE FOR BREAD YEAST.—A family instrument or machine for impregnating bread dough with carbonic acid gas, and thus avoid the necessity of using yeast.

A MUSICAL INSTRUMENT.—An improvement in musical instruments, so made that by passing a sheet of paper or other material through the instrument, the desired tune will be produced. The object of this improvement would be to enable every family to enjoy the latest and best music, or such selections as might be desired, without the requirement of educated manipulation of the instrument. The sheet or material by which the changes of sound are effected must be cheap and easily produced.

A CLOTHES DRYER.—A drying frame for clothes capable of being projected from the windows of dwelling houses.

AN ARMOR-CLAD WAR VESSEL.—Light of draft, cheap and quick of construction. As the iron plated ships have been thus far constructed, Sir Edward Belcher thought that even a well-constructed wooden ship, striking one fair across the bows, would cause such a shock as to sink the armor-plated vessel. And he declared that if he were hard-pressed, he should have no objection to try it. Indeed, he seemed to think that "compressed brown paper was one of the most powerful repellants of shot, and might be advantageously tried." Something better is needed in this line than has yet been brought out either in Europe or this country, unless the *Monitor* proves to be the desideratum, as her recent conflict with the *Merrimac* would seem to indicate she may be.

AN ATTACHMENT TO GUNS TO CUT THE ENDS OF CARTRIDGES.—At present the soldiers tear the cartridges with their teeth, but the niter and sulphur contained in the powder occasions diseases in the mouth and loss of teeth, besides causing the most acute thirst to the soldier during battle. A number of patents have been taken on devices for this purpose, but we believe there is room yet for improvement in this class of useful inventions.

WATER PIPES.—A material for making pipes for conducting water, not metallic, but pliable, durable and capable of being bent in any direction.

A TENT FOR ARMY PURPOSES—Capable of being quickly converted into a substantial boat or raft for carrying troops across rivers.

A SADDLE AMBULANCE—For mules or horses, capable of ready adjustment, so as to remove the wounded from the field of battle

CANDLES FOR ILLUMINATING PURPOSES—Capable of burning with flames of divers colors.

FLEXIBLE GLASS—Or some equally good transparent composition, capable of being bent or fashioned into any desired form.

A PLAN FOR KEEPING RIFLES CLEAN.—No rifle will shoot with accuracy unless it is kept clean, and the necessity of wiping it out carefully every time that it is loaded is a great annoyance to sportsmen. At a trial of breech-loading rifles some time ago near Boston, one of the competitors fired his gun over 100 times without cleaning it; but he had a cup of oil standing by him and dipped the cartridges in it before placing them in the gun. Could not a sponge, or bladder, or metallic case of oil be attached to the cartridge in some way so as to clean the gun at every discharge?

BREECH-LOADING SHOTGUNS AND CARTRIDGES.—We should ask no better fortune than a patent for a perfectly practicable and unobjectionable breech-loading fowling piece with a cartridge that would keep the gun clean. This would save the necessity of carrying more than one barrel, which, with the other manifest advantages, would secure an enormous sale.

SUBSTITUTE FOR VULCANIZED RUBBER PRESSURE ROLLERS NOW USED FOR CLOTHES-WRINGING MACHINES.—A substance or combination of substances which will possess the requisite degree of elasticity, and not be liable to be injured by the suds or the action of the clothes upon them.

MACHINE FOR FILLING, BY MEASUREMENT OR WEIGHT, PAPER PACKAGES OF GROUND SUBSTANCES, SUCH AS COFFEE, &C.—The packages to be neatly folded and put up and gummed at one operation.

PROTECTION FOR ORNAMENTAL MANTEL CLOCKS.—A protection for ornamental mantel clocks, which will effectually exclude dampness as well as dust, and admit of the winding up of the clock without removing the glass shade ordinarily used. This would be a great acquisition for country houses, the parlors of which are only occasionally used, and the absence of fires causing the atmosphere of the rooms to be loaded with vapor, which is ruinous to fine clocks.

IMPROVEMENT IN BIRD CAGES.—An improvement in bird cages, which will admit of the bottom being readily detached for cleaning, without removing the cage from the hook, and without the liability of liberating the bird.

A SUBSTITUTE FOR THE TURKISH PIPE AND MEERSCHAUM.—An article which will admit of the smoke being cooled in its passage from the bowl to the mouth, and deprive it of noxious substances, and still be quite short so that it may be carried in the pocket without inconvenience. The gradual advance in the price of cigars, and their general inferiority, are inducing many smokers to resort to the pipe.

FIXING COLORS IN PHOTOGRAPHY.—Photographic pictures have been taken with all their natural colors, but these were not permanent. A mode of fixing such colors would be one of the most profitable and important discoveries ever made.

RECENT AMERICAN INVENTIONS.

Evaporating Apparatus.—M. Tufts and S. G. Tufts, of Mainville, Ohio, have secured a patent for an invention which has for its object to provide for the removal of the gum or sediment which is produced by the boiling of saccharine liquids, and particularly by the boiling of the juice of sorghum cane, and which, when not removed, is the cause of that particular green or acid taste so common in the molasses. The invention consists in the arrangement of two or more sets of swinging adjustable pans in combination with a heater and furnace, in such a manner that the juice can be passed from the heater into either one of the first set of pans and thence into either one of the second set, and so on, and that the heating in either of the pans can be discontinued at the desired point, thereby giving to the operator an opportunity to draw off the clear sirup without the interruption of boiling.

Blasting Compound.—This invention relates to an improvement in blasting compounds, secured by W. R. Thomas and M. Emanuel, Jr., of Catasauqua, Pa., who obtained a patent for a similar invention April 9, 1861. Their first compound was composed of nitrate of soda, sulphur and ground bark, worked up together into a paste by the aid of a suitable quantity of water, and afterward dried. It has been found by subsequent experiment that by the addition of a certain quantity of chlorate of potash the quality of the compound is much improved, inasmuch as by the supply of additional oxygen it makes it burn quicker and increases its strength. The improvement consists in a compound made of nitrate of soda, sulphur, ground bark and chlorate of potash.

Telegraphing by Light.—L. C. Colvin and H. Gardner, of Philadelphia, Pa., have secured a patent for telegraphing by night either at sea or on land by means of a lantern, or other illuminating apparatus, with an alphabet represented by combinations of flashes of longer or shorter duration, and to this end it consists in so combining a lantern, a shutter to shut off the light thereof and an electro-magnet, that an operator at any distance from the light may, by opening and closing the circuit in which the magnet is placed, cause the said shutter to alternately expose and conceal the light, and so produce the flashes of which the signals are composed.

Roofing.—Zadok Street, of Salem, Ohio, has secured a patent for roofing, which, including labor, is less costly than one of shingles; it is also entirely fireproof, and being unaffected by changes of temperature, is more durable and effective than the best metal roof.

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ISSUED FROM THE UNITED STATES PATENT OFFICE

FOR THE WEEK ENDING MARCH 11, 1862.

Reported Officially for the Scientific American.

*** Pamphlets giving full particulars of the mode of applying for patents, under the new law which went into force March 2, 1861, specifying size of model required, and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

34,620.—C. F. Baxter, of Boston, Mass., for Improvement in Filters :

I claim an air chamber so connected with a filter and filtering medium, as to remove the collected impurities of filtration, substantially as described.

34,621.—Alexander Birkholz, of Hartford, Conn., for Improved Composition Metal of Iron, Zinc and Copper :

I claim the introduction of cast iron into a composition composed of copper and zinc, in about the proportion substantially in the manner as described.

34,622.—Samuel Colahan, of Cleveland, Ohio, for Improvement in Hay Presses :

I claim the special arrangement of the chain or rope, M, pulleys, L L′, sheave, O, and windlass, P, in combination with the lever, R, pawl and ratchet wheel, U T, and bottom, c, when these parts are arranged and operated as and for the purpose specified.

34,623.—L. O. Colvin and G. H. Gardner, of Philadelphia, Pa., for Improvement in Telegraphing by Light :

We claim the combination of a lantern or other illuminating apparatus, a reflector, a shutter and an electro-magnet, to operate substantially as and for the purpose specified.

34,624.—G. W. Cook and Z. E. B. Nash, of St. Paul, Minnesota, for Improvement in Pumps :

We claim, first The Warped flange, a, in combination with the pipe, f, and cylinder, or water chamber, m.

Second, The double-acting slide or swing-valve, b, in combination with the flange, a, and chamber, m.

Third, The extra pipe, g, in combination with the flange, a, and chamber, m, the whole being constructed and operated in the manner and for the purpose described.

34,625.—D. A. Courter, of Beloit, Wis., for Improvement in Combining a Pistol with a Sword :

I claim, first, Combining with a sword, a pistol, with a transverse sliding breech-piece.

Second The hollow breech extending beyond the breech piece, for the purpose of holding and guiding the same.

Third, Combining the guard of the sword hilt with the hollow breech.

34,626.—A. B. Ely, of Newton, Mass., for Improvement in Chain Shot for Ordnance :

I claim the projectile constructed in sections held together by bands that are to be ruptured by the explosion of the charge of the gun, and this only when the sections are held by a chain contained within the projectile.

34,627.—O. F. Fitch, of Morristown, Ind., for Improved Fruit Can :

I claim the clamp, E, in combination with the stopper, D, and india-rubber strip, C, in the manner and for the purpose set forth and described.

34,628.—John Gault, of Boston, Mass., for Improvement in Chain Shot for Ordnance :

I claim, first, The combination of the hollow sectional projectile connected with a chain, or its equivalent, inclosed and carried within itself, and the charge regulated by the fuse to extend its sections at any desired point, as set forth.

Second, I claim the securing the sections of the projectile at its front end or point, with a cap or nut, or its equivalent, as described and for the purposes set forth.

34,629.—A. F. Gray, of Belleville, Ill., for Improvement in Water Elevators :

I claim the combination and arrangement of the cylinder, A, with the recoiling plate and arms, B b b, ratchet wheel and gudgeon, G, the flat chain, H, the mode of fastening the rope at I, the form of the bail, J, for the attachment of the chain, H, the peculiar shape of the ears or hooks, K k, adapted to the tilting rod, L, and the shape of the tilting rod, and its mode of attachment at M m.

I also claim the plate, N, on the upper edge of the inside wall of the trough, in combination with the bottom of the trough, O, inclining to the corner, P, and the form of the box using the scale which accompanies the drawings as a guide for its proper construction, the whole being constructed, arranged and operating, substantially as described for the purpose set forth.

34,630.—I. A. Green, of Henry, Ill., for Improvement in Cultivators :

I claim, first, These four features combined in one machine, in the manner described; the first feature consisting in the maine frame, the bowed and cranked axle, and driver's seat, arranged in respect to each other as described; the second consisting in the arrangement of the tongue, G, the lever, H, and the driver's seat, J, in relation to each other as set forth; the third consisting in making the main frame in two parts, arranging and elevating the driver's seat, J, and the frame, E E L L and N, thereon, and the bow of the axle therein, as set forth; the fourth feature consists of the bars, O O, the frame, E E L L and N, the swivel, I, and the main frame, arranged in relation to each other as set forth.

34,631.—L. A. Green, of Rocky Hill, Conn., for Improvement in Line Holders for Mason Work, &c.:

I claim, first, The employment of the brackets, b b, combined with line, a, for holding and easily adjusting it (the line) in its proper place.

Second, I claim the pad, s, brackets, b b, and line combined as and for the purpose described.

Third, I claim the combination of the ratchet, e, spool, f, brackets, b b, line, a, substantially as and for the purposes described.

34,632.—W. H. Gwynne, of Brooklyn, N. Y., for Improved Apparatus for Making Water Gas :

I claim the distributing box, B, with its circulating and heating passage, D, and its perforated cover or top, C, the whole operating substantially as described and shown for the purpose set forth.

34,633.—James Harper, of East Haven, Conn., for Improvement in Machinery for Making Paper :

I claim, first, The combination with the Fourdrinier-wire-cloth apron, B, and the couching felt, G, so arranged as to couch the paper from the wire cloth by direct contact of the perforated cylinder, E, when these parts are so arranged that the cylinders, E and H, support the wire cloth, B, and the couching felt, G, respectively, directly opposite their point of contact with each other, substantly as set forth.

Second, The combination with each other when arranged as described, of the Fourdrinier cloth, B, couching felt, G, and beater, N, substantially as set forth.

34,634.—Henry Hayward, of Chicago, Ill., for Improvement in Safety Paper :

I claim the described means of designating varieties in the value or character of printed sheets of paper, in which threads of fibrous material are incorporated into and among the pulp, as described, to wit: the use of threads of different colors or characters, arranged substantially as specified.

34,635.—J. D. Ehlers, of Baltimore, Md., and J. P. Herron, of Washington, D. C., for Improvement in Pantaloons :

We claim, in the construction of pantaloons and drawers, making a fall, B, on the posterior portion thereof, and securing the same to the waist, A, of the pantaloons or drawers, substantially as described.

34,636.—D. A. Hopkins, of Brooklyn, N. Y., for Improvement in Railroad-Car Journal Boxes :

I claim, first, The combination of one or more springs with a movable plate bearing against the whole or a part of the diaphragm, substantially as set forth for the purposes stated.

Second, The grooving of the stop bar, substantially as shown and described for the purpose set forth.

Third, The construction of the friction plate with a flange at each end thereof, in combination with a removable seat or support, when said plate and support are constructed and combined, substantially as shown and described for the purposes stated.

34,637.—Amos Krotzer, of Woodville, Ohio, for Improved Clothes Dryer :

I claim the combination and arrangement of the frames, a a, cord, b, hinges, c, and catches, e, substantially as and for the purpose specified.

34,638.—William Mentzel and Alexander and J. W. Geddes, of Baltimore, Md., for Improvement in Lamps :

We claim the jacket tube, a a a a, as described in combination with the perforated bottom, E E, and outside cap, F, forming an air chamber for regular drafts of heated air through the perforations of the jacket tube, c c, for the supply of oxygen at the point of combustion.

34,639.—C. Messenger, of Warren, Ohio, for Improved in Clothes Wringer :

I claim the special arrangement of the adjustable clutch, L, clutch, B′, springs, S, cross bar, K, adjusting screw, P, in combination with the adjustable endless apron, R, and rollers, G and H, when operating conjointly, in the manner and for the purpose set forth.

34,640.—Martin Miller, Jr., of Vienna, Empire of Austria, for Improved Mode of Electroplating Steel Wire for Piano Strings, and other purposes :

I claim the production of steel or other music wire, provided with a copper, silver, gold or other metallic coating, substantially in the manner and for the purposes set forth.

34,641.—Henry Morse, of Natick, Mass., and Dan Perry, of Attleborough, Mass., for Improvement in Water Elevators :

We claim the arrangement and combination of a hoisting chain and a hoisting wheel with openings through its rim, for the escape of the water, substantially as described.

Second, We claim the construction and arrangement of the hook, K, when hung in the manner and for the purpose, substantially as specified.

34,642.—E. S. Muringer, of Philadelphia, Pa., for Improved Concentrated Food or Beef Tea :

I claim the concentrated food or beef tea, described, when prepared, in the manner, substantially as specified.

34,643.—Joseph Nason, of New York City, and Robert Briggs, of Brooklyn, N. Y., assignors to said Joseph Nason, for Improvement in Steam Radiators :

We claim the method, substantially as described, of constructing the tubes of steam radiators and condensers, with an interior diaphragm or dividing plate, or its equivalent, an interior tube, in combination with a single steam chamber.

34,644.—D. B. Neal, of Mount Gilead, Ohio, for Improvement in Evaporating Pans for Saccharine Juices :

I claim the employment of the pan, constructed as described, of combined sheet and cast iron, whereby the sirup may be boiled at a lower temperature, with the same fire, than the juice, as is specified.

34,645.—Resolved Read, of Brockport, N. Y., for Improvement in Machines for Cleaning and Assorting Beans :

I claim the combination of the hexagonal screen, constructed as described, flanges, e e, spouts, m n o, and case, D, feed hopper, H, spout, I, and disk, K, when arranged and operating as and for the purpose set forth.

34,646.—N. A. Rhoads, of Waterbury, Vt., for Improved Clothes Wringer :

I claim, in a clothes-wringing machine, provided with elasuc rollers, the construction of either or both of such rollers, or, in other words, the arrangement of their operating surfaces, so that they may be at a greater distance asunder at their middles than at their ends, the whole being substantially in manner and for the purpose, as described.

I also claim the arrangement and combination of the connection and bearing bar, G, with the rubber springs, g g, the shaft, H, and its cams, l l, the whole being applied to the frame, A, and its rollers, D D′, as described.

I also claim the application of each of the bars, J J, with the frame, A, by means of an adjustable fulcrum screw, i, whereby the distances of the bar, J, and the bearing head of the screw, from the frame, A, may be increased or diminished as circumstances may require.

I also claim the arrangement of the shaft, L, and its, cams, p p, with reference to the rollers, D D′, the frame, A, and the two bars, J J, or their equivalents, affixed to the said frame.

34,647.—Elisha Robbins, of Milford, Mass., for Improvement in Picker Motion for Looms :

I claim my improved arrangement of the radius arm, E, its spring, F, and the guides, g g, viz., within the support piece, D, and the rocker, C, whereby they are covered and protected from dust and accidental displacements or injury.

Also, the arrangement of the heel guide or back stop, i, with the rocker and the support piece.

Also, the arrangement and combination of the oil cups, with the rocker, the support piece and the radius arm, applied to the latter and the rocker.

34,648.—H. C. Sherman, of Buffalo, N. Y., for Improved Condenser for Stells :

I claim, first, Making the condenser of zig-zag condensing pipes, arranged side by side in sections, and parallel to each other, or nearly so, each section opening in and connecting to a transverse supply pipe at the top and a transverse discharge pipe at the bottom, for the purposes, and substantially as described.

Second, I claim the combination of the sections, B C D, with the transverse discharge and supply pipes, E and F, each transverse pipe having short pipes, b′ c′ and d′, &c., and b2 c2 d2, &c., to admit of an easy connection, and disconnection of the sections thereto, for the purposes, and substantially as set forth.

Third, I claim the combination and arrangement of the perforated cold water feed pipe, H, with a condenser, constructed in sections, substantially as set forth.

34,649.—C. W. Smith, of New York City, for Improvement in Friction Matches :

I claim the use of paraffine in the manufacture of matches, in the manner and for the purposes described.

34,650.—R. A. Smith, of Newburyport, Mass., for Improvement in Fences :

I claim my mode of constructing each fence section, in order that two or more of them may be arranged and combined, as specified, the said mode consisting in making it with two interlocking projections, and with the mortise arranged in each end of it, substantially as specified.

I also claim the combination and arrangement of the connecting bar, D, with two fence sections, when constructed, interlocked and arranged together, substantially in manner as set forth.

34,651.—J. A. Southmayd, of Jersey City, N. J., for Improvement in Vacuum Pans for Evaporating :

I claim the plunger or lifter, when constructed and operated in combination with evaporating pans, as specified.

I also claim evaporating pans, constructed and arranged in the manner and for the purpose set forth.

Lastly, I claim the condenser and pump, constructed in the manner described, in combination with pans used for evaporating purposes.

34,652.—H. N. Stearns, of Chardon, Ohio, for Improvement in Churn Dashers :

I claim, first, A horizontal churn dasher, consisting of a crank shaft, F, arms, A, metallic wires, C, and rods, B, all combined and arranged in the manner set forth.

Second, Stretching the wires, C, between the arms, A, by soldering the said wires in their metallic plates, D, and securing the latter within the arms, A, as explained.

[By this invention the entire mass of cream is subjected to cutting and frictional action without unnecessary violence and agitation. The result is the rapid production of a large quantity of butter, of superior quality, with but little labor.]

34,653.—Zadok Street, of Salem, Ohio, for Improved Cement and Tile Roofing :

I claim a roof composed of a rigid body of any suitable material, laid in and covered by cement, compounded substantially as set forth.

34,654.—W. R. Thomas and Morgan Emanuel, Jr., of Catasauqua, Pa., for Improved Blasting Powder :

I claim the blasting compound made of nitrate of soda, sulphur, ground bark and chlorate of potash, in the manner substantially as, and in about the same proportions set forth.

34,655.—M. and S. G. Tafts, of Mainville, Ohio, for Improved Apparatus for Evaporating Sugar Juices :

We claim, first, The arrangement and combination of two or more sets of swinging adjustable pans, E E′ G G′, with the flue, C, heater, A, and furnace, B, all constructed, operated and operating substantially in the manner and for the purpose shown and described.

Second, The combination with the pans, E E′ G G′, of swinging levers, F H, and transversely-moving carriages, d h, substantially as and for the purpose specified.

Third, The arrangement of the continuous open flue, C, and dampers, I I′, in combination with the pans, E E′ G G′, as and for the purpose set forth.

34,656.—Maurice Vergnes, of New York City, for Improvement in Liquids for Exciting Galvanic Batteries :

I claim the preparation and production of a fluid for use in galvanic batteries in the place of nitric acid, composed or prepared with a solution of the two salts, bichromate and chlorate of potash in connection with peroxide of manganese treated with sulphuric acid, as described, the whole prepared substantially as set forth.

34,657.—Richard Vose, of New York City, for Improvement in Car Springs :

I claim an improved compound spring, produced by interposing a packing of elastic gum, or the equivalent thereof, between the coils of a spiral or a helical metallic spring, substantially in the manner set forth.

34,658.—C. J. Woolson, of Cleveland, Ohio, for Improvement in Cooking Stoves :

I claim the use of an inside fire door or movable plate, attached by hinges to the inside upper corners of the front door frame of cooking stoves and by catches to the front edge of the horizontal lower fire grate, so as to retain the fuel in its place for the purpose of roasting and to allow the inside door to be swung outward and upward, that coals may be drawn from the fire for the purpose of broiling.

34,659.—Charles Wright, of Newark, N. J., for Improvement in Tool Posts or Holders :

I claim a tool post or holder constructed in the manner and for the purpose as specified.

34,660.—Geo. Cessford (assignor to John S. and Meritt Peckham), of Utica, N. Y., for Improvement in Stove Dampers :

I claim the combination and arrangement of the register plate, A the damper, B, and the expansion rod, F, all constructed and operating substantially as described.

34,661.—Patrick Foy (assignor to himself and John Fitch) of New York City, for Improvement in Apparatus for Boring and Rifling Cannon :

I claim, first, the head block, g, provided with the adjustable ring, 4, pin, 6, and stop, q, together with the frame, c, and driving gearing, in combination with the screw, i, and spirally grooved cutter stock, h the whole arranged and acting in the manner and for the purpose substantially as specified.

Second, I claim the guiding segments, s s, and plate, t, arranged and acting as and for the purposes set forth.

Third, I claim the auxiliary shaft, u, provided with the gearing, v m, in combination with the tool or cutter stock, h, and screw, i, with their respective gears, w l, substantially as and for the purposes specified.

34,662.—W. T. Grant (assignor to himself and J. S. Snyder), of Jacksonville, Ill., for Improvement in Machines for Grading and Excavating :

I claim, first, The arrangement of the tongue, S, and truck, M, with the driver's seat, R, and the oscillating adjustable lever, P, as shown and described.

Second, The arrangement of the two parts of the main frame, d e, with each other, in the manner shown and described, so as to be separately self-adjusting in respect to the surface of the ground, all as set forth.

[The object of this invention is to obtain a machine of simple construction which may be used for grading, excavating, ditching and like purposes, and consists in the employment or use of a share, guide box, endless conveying apron, rotary cutter. The invention also consists in a novel arrangement of the main frame of the machine with its front track, whereby the depth of the penetration of the blow may be regulated as required.]

34,663.—Gustavus Hammer (assignor to Holstein and Hammer), of Cincinnati, Ohio, for Improved Machine for Framing Oval Moldings :

I claim, first, In combination with stops, F F, and feed wheel, E, outer frame, H, or its equivalent, surrounding frame, I, and having a contour differing from the same, when so adapted to stops. F F, and the form of the frame, I, as to cause the latter to be fed under cutter head, B, appropriately thereto, substantially as described.

Second, I claim the arrangement of standard, G, brackets, f, small sleeves, g h,, spring, l, and lever, n, substantially as and for the purpose set forth.

34,664.—Philander Shaw (assignor to C. E. Hodges and N. D. Silsbee), of Boston, Mass., for Improvement in Writing Tablets :

I claim a tablet formed of wood compressed to resist the indenting action of pencils or crayons and covered on one or both surfaces with a preparation having a suitable tooth to receive marks for crayons or pencils. Also such a tablet when formed by compression so as to leave a raised border or frame on and around one or both surfaces of the tablet and integral with it.

34,665.—T. J. Young (assignor to himself and John Elder), of Philadelphia, Pa., for Improvement in Counting Machines :

I claim the numbering wheels, 1, 2, 3, &c., with their projections and the plates, G G, in combination with the cog wheels, 7, 8, 9, &c., and the plates, I, when the said plates, G and I, are prevented from turning by the rods, H and J, or their equivalents, and when the whole of the plates and wheels are acted on by the spiral springs, or their equivalents, as and for the purpose set forth.

34,666.—Richard Montgomery, of New York City, for Improvement in Ordnance :

I claim, first, Incasing a longitudinally corrugated cylinder with a series of corrugated layers divided transversely in sections, the corrugations of which fit into each other, and run around in the direction of the curves of the arch, as described.

Second, In combination with the outer and inner cylinder thus formed, I claim the use of the hollow tubes or bars, a a a a, as and for the purposes set forth.

Third, In combination with the outer and inner cylinder thus formed, I also claim the mode described of securing the several parts thereof to each other and to the breech of the cannon, that is to say, the bolts, e and f, arranged as set footh.

RE-ISSUE.

1,286.—Charles Mettam (assignee of Samuel Nowlan), of New York City, for Improvement in Galvanic Soles. Patented June 18, 1861 :

I claim, first, The formation of articulated electro-voltaic plate work in sections, as described, throughout the whole or major portion of its area so as to give to the same a general pliability, and formed of copper and zinc plates, or their equivalents, essentially as described, and the several sections of negative and positive plates being united in separate relations to their contiguous sections by a flexible insulating strip or strips, substantially as specified.

Second, Uniting the several sections of articulated electro-voltaic

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plate work, by means of eyelets or their equivalents, substantially as set forth.

Third, The employment of a skeleton flexible insulator for uniting the several sections of articulated galvano-electric plate work.

1,287.—Jesse A. Crandall, of New York City, for Improved Rocking Toy. Patented May 17, 1859:

I claim the combination of the body, A, whether made in the form of a hobby horse or of a toy of other description of the class described with the base, B B, and a spring or springs, C, for producing a rocking movement, as and for the purpose described.

New Publications.

NEW MILITARY MAP OF THE SOUTHERN AND BORDER STATES. Just issued by H. H. Lloyd & Co., No. 25 Howard street, New York City.

We find this a very useful map indeed, and can recommend it to our readers. It contains all the chief points of interest at the present time.

LONDON, EDINBURGH, NORTH BRITISH and WESTMINSTER REVIEWS. These periodicals, with "Blackwood's Magazine," are re-published by Leonard Scott & Co., No. 54 Gold street, New York City.

These five publications present to us the thoughts and opinions of the leading minds of England, and they exercise a potent influence on public affairs. All the last issues of these reviews contain articles on the "American Crisis." The "London" is intensely Tory, as might have been expected; the others are more liberal, but not fully enlightened on this great and intricate question. The most distinguished European writers who seem to understand it, are Count Gasparin, in France, and J. Stuart Mills, in Scotland. Their instincts, learning and reasoning are against oppression and wrong.

PATENTS FOR SEVENTEEN YEARS.

The new Patent Laws enacted by Congress on the 2d of March, 1861, are now in full force, and prove to be of great benefit to all parties who are concerned in new inventions.

The duration of patents granted under the new act is prolonged to SEVENTEEN years, and the government fee required on filing an application for a patent is reduced from **$30** down to **$15.** Other changes in the fees are also made as follows:—

On filing each Caveat	$10
On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
On appeal to Commissioner of Patents	$20
On application for Re-issue	$30
On application for Extension of Patent	$50
On granting the Extension	$50
On filing Disclaimer	$10
On filing application for Design, three and a half years	$10
On filing application for Design, seven years	$15
On filing application for Design, fourteen years	$30

The law abolishes discrimination in fees required of foreigners, excepting reference to such countries as discriminate against citizens of the United States—thus allowing English, French, Belgian, Austrian Russian, Spanish, and all other foreigners except the Canadians, to enjoy all the privileges of our patent system (except in cases of designs) on the above terms.

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The Examination of Inventions.

Persons having conceived an idea which they think may be patentble, are advised to make a sketch or model of their invention, and submitit to us, with a full description, for advice. The points of novelty are carefully examined, and a reply written corresponding with the facts, free of charge. Address MUNN & CO., No. 37 Park-row, New York.

Preliminary Examinations at the Patent Office.

The advice we render gratuitously upon examining an invention does not extend to a search at the Patent Office, to see if a like invention has been presented there, but is an opinion based upon what knowledge we may acquire of a similar invention from the records in our Home Office. But for a fee of $5, accompanied with a model or drawing and description, we have a special search made at the United States Patent Office, and a report setting forth the prospects of obtaining a Patent &c., made up and mailed to the Inventor, with a pamphlet, giving instructions for further proceedings. These preliminary examinations are made through our Branch Office, corner of F and Seventh-streets, Washington, by experienced and competent persons. More than 5,000 such examinations have been made through this office during the past three years. Address MUNN & CO., No. 37 Park-row, N. Y.

How to Make an Application for a Patent.

Every applicant for a Patent must furnish a model of his invention, if susceptible of one; or if the invention is a chemical production, he must furnish samples of the ingredients of which his composition consists, for the Patent Office. These should be securely packed, the inventor's name marked on them, and sent, with the government fees by express. The express charge should be prepaid. Small models from a distance can often be sent cheaper by mail. The safest way to remit money is by draft on New York, payable to the order of Munn & Co. Persons who live in remote parts of the country can usually purchase drafts from their merchants on their New York correspondents; but, if not convenient to do so, there is but little risk in sending bank bills by mail, having the letter registered by the postmaster. Address MUNN & Co No. 37 Park-row, New York.

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Persons desiring to file a Caveat can have the papers prepared in the shortest time by sending a sketch and description of the invention. The government fee for a Caveat, under the new law, is $10. A pamphlet of advice regarding applications for Patents and Caveats, in English and German, furnished gratis on application by mail. Address MUNN & CO., No. 37 Park-row, New York.

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Rejected Applications.

We are prepared to undertake the investigation and prosecution of rejected cases, on reasonable terms. The close proximity of our Washington Agency to the Patent Office affords us rare opportunities for the examination and comparison of references, models, drawings, documents, &c. Our success in the prosecution of rejected cases has been very great. The principal portion of our charge is generally left dependent upon the final result.

All persons having rejected cases which they desire to have prosecuted are invited to correspond with us on the subject, giving a brief history of the case, inclosing the official letters, &c.

Assignments of Patents.

The assignment of Patents, and agreements between Patentees and manufacturers, carefully prepared and placed upon the records at the Patent Office. Address MUNN & CO., at the Scientific American Patent Agency, No. 37 Park-row, New York.

It would require many columns to detail all the ways in which the Inventor or Patentee may be served at our offices. We cordially invite all who have anything to do with Patent property or inventions to call at our extensive offices, No. 37 Park-row, New York, where any questions regarding the rights of Patentees, will be cheerfully answered.

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G. W. S., of Pa.—The question of pointed projectiles for piercing armor plates has been much discussed in the SCIENTIFIC AMERICAN and other papers.

B. W. T., of Ill.—Hydraulic cement is spoiled by being wet unless it is used immediately. You can easily try yours by wetting a little and cementing two stones together with it. Any bar of iron or steel standing for a long time in a vertical position becomes magnetic. We have tried many old pairs of tongs with a compass and always found that one end would attract the North pole and the other the South. We should like a more minute account of the action of the tacks of which you speak.

F. E. M., of Mass.—We recommend Wells's Chemistry as an excellent hand book.

A. C. D., of Mich.—The number of pounds required to hold your scow against the current would depend very much on the form of the scow.

T. A. H., of Ill.—If a cylinder 12 inches in diameter with its upper end open, has a piston fitted into it airtight, and a weight is placed on the piston, the cylinder below the piston being filled with water; the water will be forced out of an opening an inch square in the lower end of the cylinder with a force just equal to the pressure of the weight on each square inch of the piston—minus the friction.

T. J., of Ind.—We have had considerable experience with cement pipes, and like them very well for small aqueducts, but do not believe they would answer for 10,000 gallons per day under a pressure of 60 feet head. We presume cast iron would be the only suitable material in such a case.

W. B., of Pa.—If the invention to which you refer as having been patented and described in the SCIENTIFIC AMERICAN is an old and well known device then surely the patent is of no value and any one can use it with impunity. We do not admit the right of parties ordinarily to attack the validity of a patent in our columns. It would be unjust to the patentee and lead to abuses dangerous to the interests of inventors.

G. E. M., of N. B.—Quite a number of amalgamators have been illustrated and described in former volumes of the SCIENTIFIC AMERICAN. Consult these and write to the patentees of such machines, respecting their price, &c.; also to J. & E. W. Barker, of Baltimore, Md., on the particulars of the amalgamator illustrated on page 97, Vol. II. (new series) SCIENTIFIC AMERICAN.

G. W. L., of N. Y.—We are not acquainted with any other treatise on watch making but the "Clock and Watch Maker's Manual," excepting Reid's treatise on Horology which would be of no use to you for the repairing of watches.

J. R., of Wis.—We think that the pendulum question is about exhausted.

H. C. R., of N. Y.—If a cannon pointing due south is discharged while it is moving due west with velocity equal to that of the ball, the direction of the ball will not vary appreciably from a southwest course in the extent of its range. If it should go a thousand miles its course would curve a little to the west in consequence of the surface of the earth at the equator, moving more rapidly than at the poles.

A. B. S., of Conn.—We cannot advise you to substitute a wind-wheel for a steam engine of 10-horse power to be employed in grinding tan bark. A wind-wheel of such power would be very large and its action very irregular.

C. A. D., of N. Y.—India rubber boats were used on the first Arctic expedition of Dr. Kane, but we do not know how much they weighed.

S. P., of N. Y.—The soles of boots and shoes have been provided with metallic guards arranged in various ways. We have some doubts of the patentability of your particular plan of applying them, as we cannot see that it differs essentially from many others.

SPECIAL NOTICE—FOREIGN PATENT.—The population of Great Britain, is 30,000,000; of France, 35,000,000; Belgium, 5,000,000; Austria, 40,000,000; Prussia, 20,000,000; and Russia, 60,000,000. Patents may be secured by American citizens in all of these countries. Now is the time, while business is dull at home, to take advantage of these immense foreign fields. Mechanical improvements of all kinds are always in demand in Europe. There will never be a better time than the present to take patents abroad. We have reliable business connections with the principal capitals of Europe. Nearly all of the patents secured in foreign countries by Americans are obtained through our agency. Address Munn & Co., 37 Park row, New York. Circulars about foreign patents furnished free.

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Specifications and drawings and models belonging to parties with the following initials have been forwarded to the Patent Office from March 5 to Wednesday, March 19, 1862:—

J. C. N., of Pa.; H. and M., of N. Y.; W. B., of N. Y.; H. and B., of Mich.; R. S., of N. Y.; F. B. P., of N. Y.; H. O. P., of Mass.; C. D. I., of Mass.; W. O., of N. Y.; E. R. McC., of Iowa; A. C., of N. Y.; H. H. E., of Conn.; E. B. R., of N. J.; W. T., of N. Y.; E. C. F., of Mass.; J. H. G., of Mass.; J. R., of N. Y.; A. G. B., of Conn.; J. J. A., of Mich.; A. I., of Iowa; C. H. and W. G. D., of Pa.; A. K. R., of Vt.; R. P. G., of Wis.; G. and C., of Conn.; E. Y., of N. Y.; J. McG., of N. Y.; J. A. W., of N. J.; A. L. W., of Mass.; J. Van B., of N. Y. (2 cases); W. S., of N. J.; J. R. G., of Ill.

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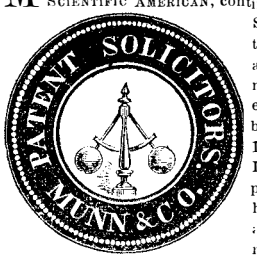
MESSRS. MUNN & CO., PROPRIETORS OF THE SCIENTIFIC AMERICAN, continue to solicit patents in the United States and all foreign countries, on the most reasonable terms. They also attend to various other departments of business pertaining to patents, such as Extensions, Appeals before the United States Courts Interferences, Opinions relative to Infringements, &c. The long experience Messrs. MUNN & Co. have had in preparing Specifications and Drawings, extending over a period of sixteen years, has rendered them perfectly conversant with the mode of doing business at the United States Patent Office, and with the greater part of the inventions which have been patented. Information concerning the patentability of inventions is freely given, without charge, or sending a model or drawing and description to this office.



Consultation may be had with the firm between NINE and FOUR o'clock, daily, at their PRINCIPAL OFFICE, No. 37 PARK ROW, NEW YORK. We have also established a BRANCH OFFICE in the CITY OF WASHINGTON, on the CORNER OF F AND SEVENTH STREETS, opposite the United States Patent Office. This office is under the general superintendence of one of the firm, and is in daily communication with the Principal Office in New York, and personal attention will be given at the Patent Office to all such cases as may require it. Inventors and others who may visit Washington, having business at the Patent Offices are cordially invited to call at their office.

They are very extensively engaged in the preparation and securing of Patents in the various European countries. For the transaction of this business they have Offices at Nos. 66 Chancery Lane, London; 29 Boulevard, St. Martin, Paris, and 26 Rue des Eperonniers, Brussels. We think we may safely say that three-fourths of all the European Patents secured to American citizens are procured through our Agency.

A pamphlet of information concerning the proper course to be pursued in obtaining Patents through their Agency, the requirements of the Patent Office, &c., may be had gratis upon application at the Principal Office, or either of the Branches. They also furnish a Circular of information about Foreign Patents.

The annexed letters from former Commissioners of Patents we commend to the perusal of all persons interested in obtaining Patents:—

MESSRS. MUNN & CO.:—It affords me much pleasure in stating that while I held the office of Commissioner of Patents MORE THAN ONE-FOURTH OF ALL THE BUSINESS OF THE OFFICE came through your hands. I have no doubt that the public confidence thus indicated has been fully deserved, as I have always observed, in all your intercourse with the Office, a marked degree of promptness, skill and fidelity to the interests of your employers. Yours, very truly, CHAS. MASON.

Immediately after the appointment of Mr. Holt to the office of Postmaster General of the United States, he addressed to us the subjoined very grateful testimonial:—

MESSRS. MUNN & CO.:—It affords me much pleasure to bear testimony to the able and efficient manner in which you discharged your duties as Solicitors of Patents while I had the honor of holding the office of Commissioner. Your business was very large, and you sustained (and, I doubt not, justly deserved) the reputation of energy, marked ability, and uncompromising fidelity in performing your professional engagements. Very respectfully,
Your obedient servant, J. HOLT.

MESSRS. MUNN & CO.—*Gentlemen:* It gives me much pleasure to say that, during the time of my holding the office of Commissioner of Patents, a very large proportion of the business of inventors before the Patent Office was transacted through your Agency, and that I have ever found you faithful and devoted to the interests of your clients, as well as eminently qualified to perform the duties of Patent Attorneys with skill and accuracy. Very respectfully, WM. D. BISHOP.

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TO OIL REFINERS.—PERSONS ENGAGED IN OIL refining can obtain a recipe, on moderate terms, giving full information how to refine and deodorize rock oil, by applying to THOMAS PARRY, Pittsburgh, Pa. 6 10*

CENTRIFUGAL SUGAR MACHINES—MESSRS. ASpinwall & Woolsey's patent.—George B. Hartson, No. 111 East Forty-second street, continues to execute orders, and gives his personal attention to the erection of the above machines, and will also furnish plans and estimates for complete sugar refineries, with all the latest improvements. 22 6m*

Zur Beachtung für deutsche Erfinder.

Die Unterzeichneten haben eine Anleitung, die Erfindern das Verhalten angibt, um sich ihre Patente zu sichern, herausgegeben, und verabfolgen solche gratis an dieselben.

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Improved Tent.

Serious inconvenience is found to result in tents made of canvas from the contraction of the cloth when it is wet, and its corresponding expansion when dry. At one time the canvas hangs in a loose state, flapping in the wind, and at another it is either torn by its contraction, or the pins which secure its lower edge are drawn from the ground. To remedy this evil tent poles have been made so that they could be lengthened or shortened, at the will of the occupants. The accompanying engraving illustrates an improved plan for extension tent poles, together with an improvement in the mode of ventilating tents.

Fig 1.

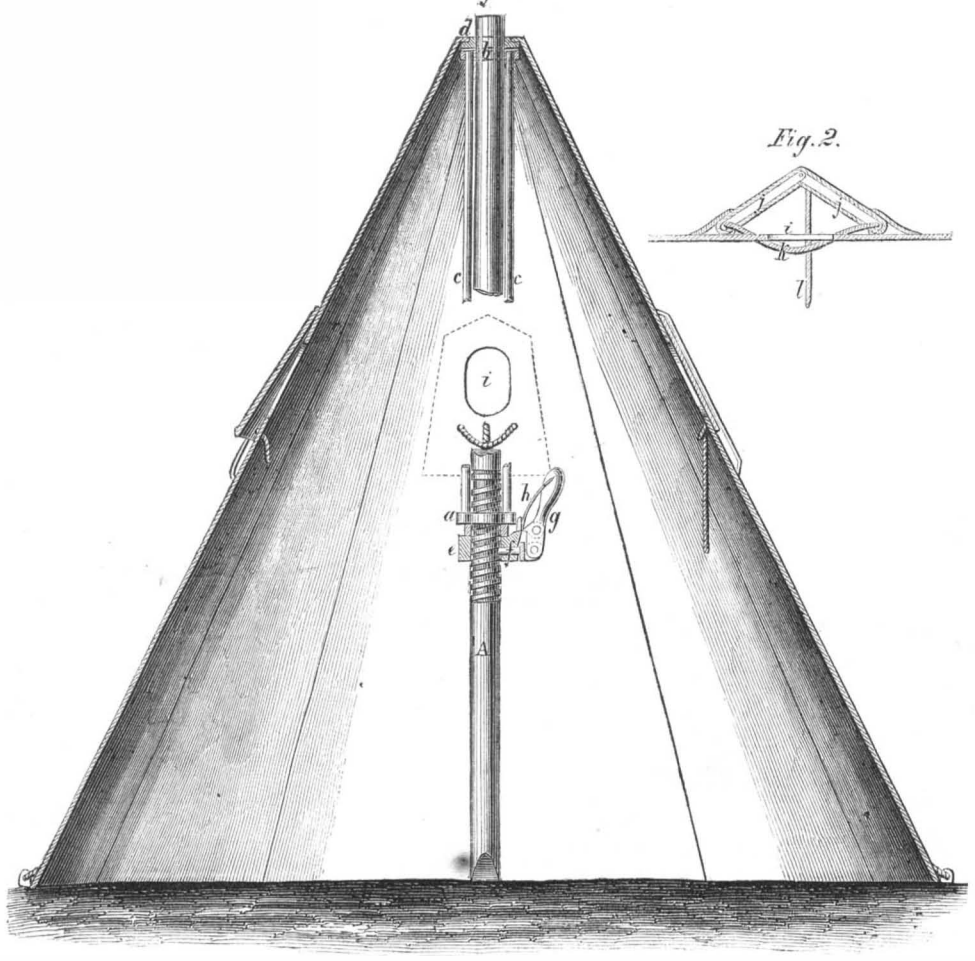

Fig. 2.

TOWNSEND'S ARMY TENT.

The tent pole, A, Fig. 1, is made of suitable length, with a screw upon it at the proper hight to be within convenient reach of a man's hand. Fitting loosely around the outside of this screw is the band, *a*, which is rigidly connected with the band, *b*, at the top of the tent, by the rods, *c c*. The canvas is secured at the summit to the loose ring, *d*, which rests upon the band, *b*, from which arrangement it will be seen that the canvas may be tightened by raising the bands, *a* and *b*, and thus lifting the ring, *d*, or it may be loosened by lowering these parts.

The band, *a*, with its connections, is raised or lowered by means of the ring, *e*, which fits loosely around the screw upon the tent pole, but is connected with this screw by the pin, *f*, the end of which enters between the threads of the screw. Thus, by turning the ring, *e*, around the pole, the band, *a*, is raised or lowered.

The pin, *f*, is attached by a pin joint to the lower end of the lever, *g*, the upper end of which is pressed outward by the spring, *h*, to hold the pin, *f*, in place. But in taking the tent down, the upper end of the lever, *g*, is pressed inward to the pole, thus withdrawing the pin, *f*, from between the threads of the screw, and allowing the band, *a*, and its connections to fall.

In pitching the tent, the pins at the outer edge are first driven into the ground, the pole is then inserted into the ring, *d*, and the ring, *e*, is lifted till the pin, *f*, catches into the screw; when, by a few turns of this ring around the pole, the canvas is tightened to any desired degree of tension.

For ventilating the tent, apertures are made at the desired hight in its sides, which are covered by flaps, so arranged that their lower ends may be pressed out from the side of the tent to admit air, or allowed to fall against it at will. To this end two sticks, *j j*, are connected by a pin joint, and sewed into the hem in the lower edge of the flap. A cord, *k*, is attached at its ends to the outer ends of the sticks, with its loop hanging within the tent, so that by pulling this loop the outer ends of the sticks are drawn toward each other, and the joint at the middle is bent outward, bowing out the lower edge of the flap. The ventilator is closed by pulling the cord, *l*, which is fastened to the sticks at the joint. Suitable pockets protect the flap at its edges.

This ventilator is a simple one, involving little, if any, additional expense, and enabling the occupants of a tent to regulate its ventilation without exposing themselves to the weather outside.

The patent for this invention was granted, through the Scientific American Patent Agency, March 4, 1862, and further information may be obtained by addressing the inventor, George O. Townsend, at No. 30 Avery street, Boston, Mass.

Conservatory in the Central Park.

One of our cotemporaries states that the Central Park Commissioners have contracted for the construction of a grand conservatory, the largest in the United States, upon the Park grounds. The building is to be a "Crystal Palace," of iron and glass, 200 feet long, 70 feet wide, and about 50 feet high. Its base will be a parallelogram, and there will be three stories, curving inward like the successive folds of a turban. The conservatory will front Fifth avenue; its center being opposite Seventy-fourth street; and directly in its rear will be a beautiful little pond, with walled sides of a symmetrical shape, which will be built during the coming two years. When the Fifth avenue is graded to its proper hight, it will be on a level with the second story of the proposed conservatory; and the main entrance to the edifice will therefore be on that story. Stairs and balconies will give access to every portion of the building. The contract provides that the grantees must erect the building entirely at their own expense, after the plans already agreed upon; that they must place in it nothing but flowers, or rare trees or plants; that they shall be allowed to sell bouquets, &c., to visitors; that the public shall always be admitted free; that good order shall always be maintained inside, at the expense of the grantees; and that the work shall be completed by the 1st of January 1864. The specifications of the contract are minute and are believed to cover the objections which might be made to the granting of a monopoly of such a character. The grantees, on their part, agree to pay a rent which will add considerably to the revenues of the Park. The conservatory will cost about $50,000.

Great Product of Iron.—Blast furnace No. 3, of the Lackawanna Iron and Coal Company, at Scranton, Pa., made, during four weeks, the largest amount of iron ever produced in that length of time by a single furnace in the United States, and probably in the world, the yield of the last week amounting to 375½ tuns. For the week ending January 25, 356 tuns; for the week ending February 1, 342 tuns; for the week ending February 8, 357 tuns; for the week ending February 15, 375 tuns—average, 357½ tuns. This furnace is 50 feet high, 19 feet in diameter at top of boshes, and is blown through 18 tuyeres, with seven pounds pressure of blast.

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To the Inventor!

The SCIENTIFIC AMERICAN is indispensable to every inventor, as it not only contains illustrated descriptions of nearly all the best inventions as they come, but each number contains an Official List of the Claims of all the Patents issued from the United States Patent Office during the week previous; thus giving a correct history of the progress of inventions in this country. We are also receiving, every week, the best scientific journals of Great Britain, France and Germany; thus placing in our possession all that is transpiring in mechanical science and art in these old countries. We shall continue to transfer to our columns copious extracts from these journals of whatever we may deem of interest to our readers.

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